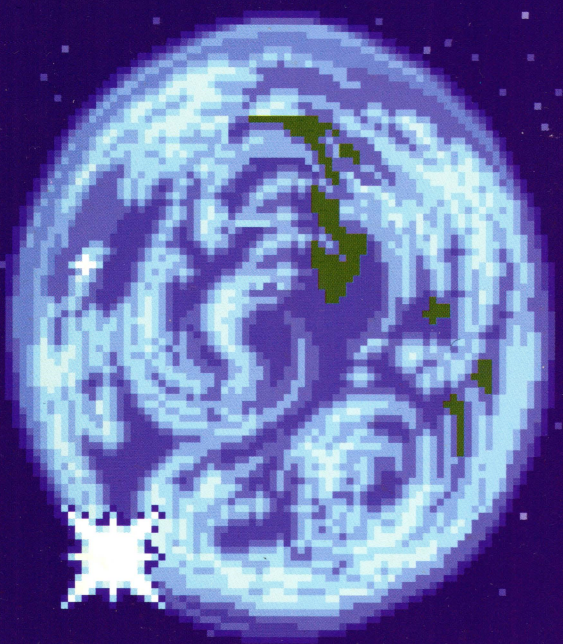
EDGE PRESENTS

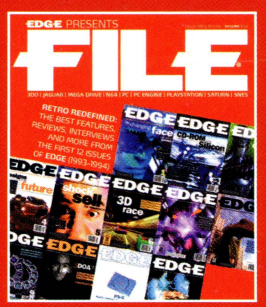
COLLECTOR'S EDITION **VOLUME 1** £8

FILE®

3DO | JAGUAR | MEGA DRIVE | N64 | PC | PC ENGINE | PLAYSTATION | SATURN | SNES

RETRO REDEFINED:
THE BEST FEATURES, REVIEWS, INTERVIEWS AND MORE FROM THE FIRST 12 ISSUES OF **EDGE** (1993–1994)





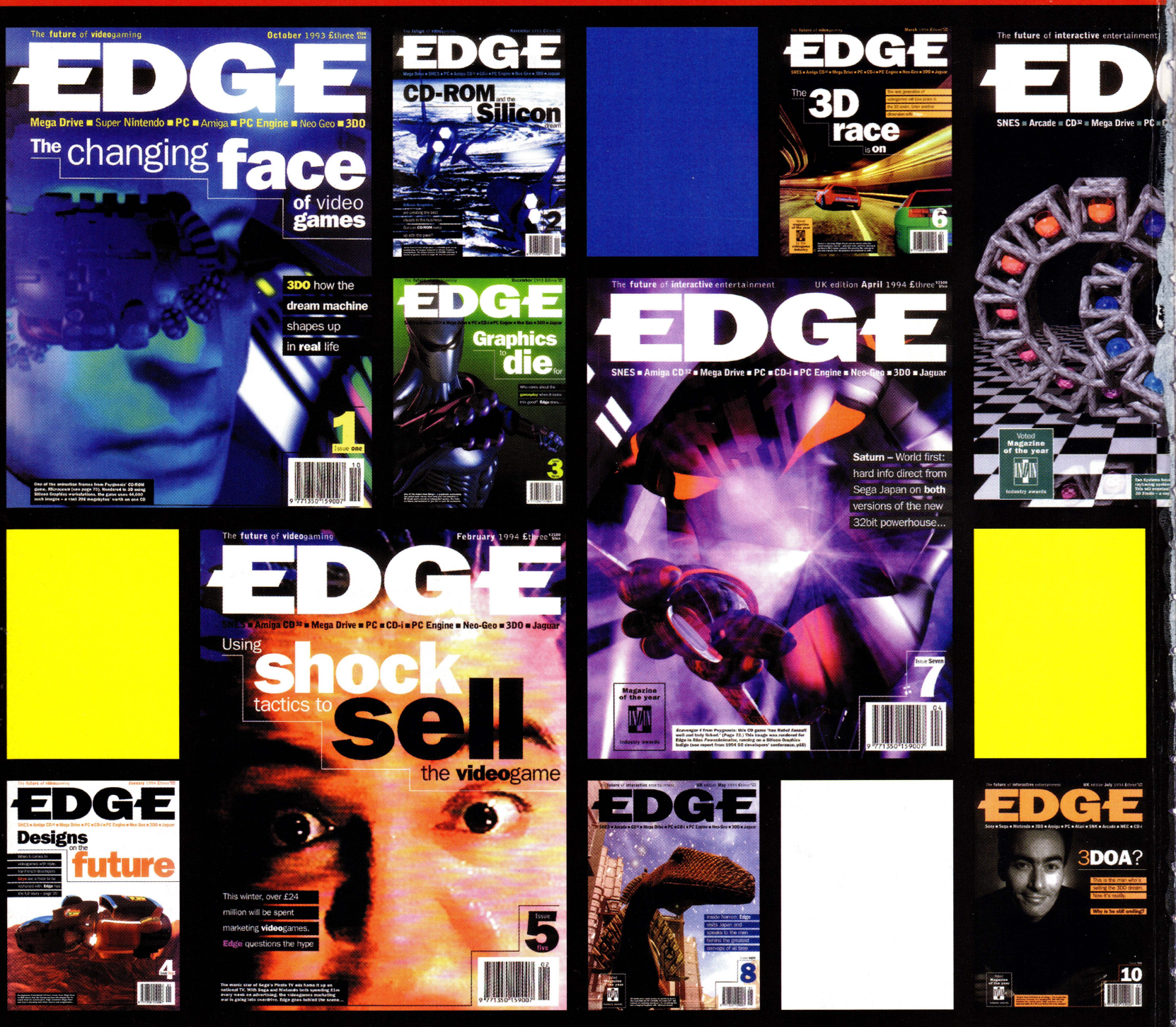
Whenever **Edge**'s early success is discussed, all sorts of theories are thrown into the mixer. It didn't talk to its readers as if they were idiots. Its design let the game content do the talking. It was placed on the newsstand in a mysterious opaque packaging. There's mileage in all of these theories. What's commonly overlooked, though, is that 1993, the year **Edge** made its debut, was also just *the right time* for a different magazine about videogames.

Because videogaming, or interactive entertainment, or whichever label you wish to slap on it in 2006, was in 1993 undergoing the most significant change it had ever experienced. Yes, Atari's 1983 coin-op *I, Robot* introduced filled polygons to arcades, but it didn't kick start a sea change in game graphics. Similarly, the advent of hard drives, although significant, didn't revolutionise the way games were made. Other developments along the way created ripples, not tidal waves. In 1993, though, so many concepts and technologies were emerging that it was inevitable that gaming was going to undergo significant change, soon. Not that anyone at the time knew precisely what would be the result.

Making your way through some of the highlights of the first 12 issues of **Edge** in this edition of **File** will either remind you of the turbulence of this period or give you an insight into its fascinating month-by-month progression (and, indeed, the evolution of the magazine) for the first time. New graphics technologies are debuted. Fresh, exciting gameplay models are discussed. Many claims are made.

Not all of what you will read should be taken seriously – that, of course, is the warm-glowing benefit of hindsight. (Be sure to take some of the new commentary in the right spirit, too.)

First, though, it's worth recalling the origins of **Edge** itself from a reprint of an article that originally appeared in its tenth-anniversary edition, beginning on page 6. Then take the trip into an era in which interactive movies, Gouraud shading and motion-capture technologies jostled together as gaming's frontiers truly pushed forward...



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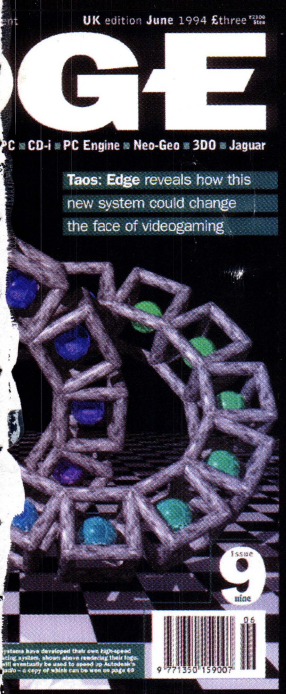

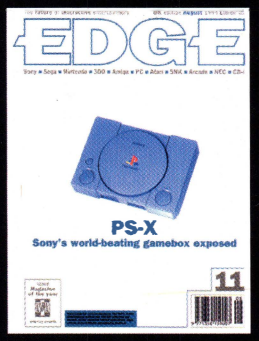

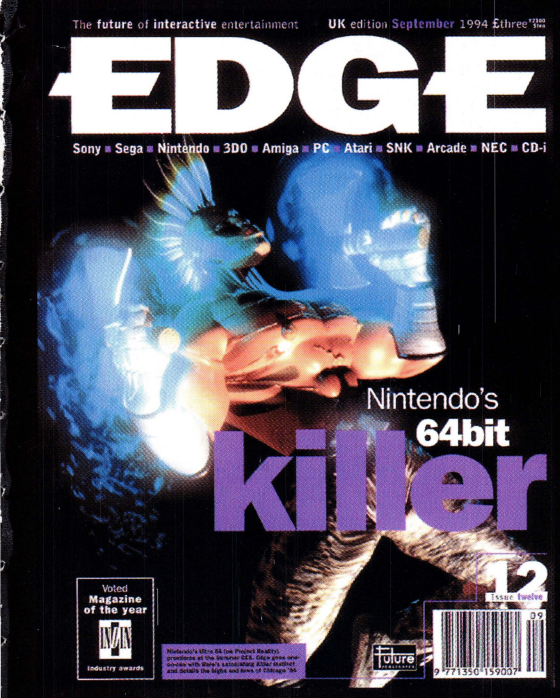

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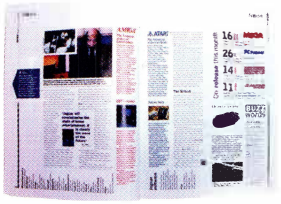
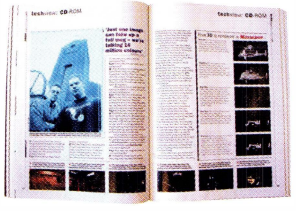
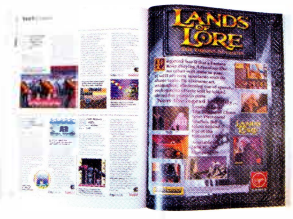
The making of...

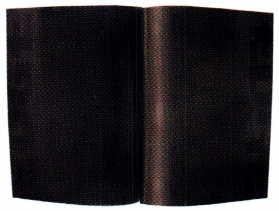
Edge

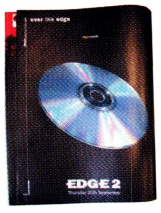
Future Publishing launched **Edge** as a new kind of videogame magazine. It went on to outlive many of the hardware formats it covered and is still going strong after seeing in a new millennium. Here, **Edge** rather self-indulgently looks back to the launch of the very first issue...











Freddie Mercury's 'Living on my Own' was riding atop the charts, having toppled Take That's 'Pray'. Ex-circus performer John Major was still Prime Minister and just about in charge of the Conservative Party. Trip Hawkins had just launched the 3DO. The CD-ROM was apparently going to usher in a new era of videogaming. The PS-X was little more than a glint in Ken Kutaragi's eye, while the Dolphin and the Xbox hadn't even progressed that far. Videogame hardware such as the Mega Drive and SNES were supported by magazines such as 'SuperPlay', 'Mean Machines', 'Computer & Video Games', 'The One', 'Sega Power' and even 'Sinclair User'. What was then the 'World Wide Web' was still in its infancy. Members of the current **Edge** editorial team were variously working hard in sixth forms or universities around the country. And, on August 19, 1993, **Edge** magazine was launched.

That first issue arrived in an opaque black bag, loudly proclaiming that it "wasn't for everyone"; a multiformat videogame magazine aimed at older, serious gamers. Underneath the masthead was a list of the hardware formats that it would cover: Mega Drive, Super Nintendo, PC, Amiga, PC Engine, Neo Geo and 3DO. It was largely the brainchild of launch editor **Steve Jarratt**, who had started his career in videogame journalism on 'Zzap!64', along with publisher **Steve Carey** and art editor **Matthew Williams**. The rest of the editorial team on the launch issue consisted of deputy art editor Rob

Original format: **Royal Press 90gsm, 280mm x 210mm**
Publisher: **Future Publishing**
Developer: **Carey, Jarratt, Williams, Abbott, Wylie, Brookes, Andreas**
Origin: **UK**
Original release date: **1993**

The first issue of **Edge** saw various luminaries, including a youthful Jez San, indulge in some idle speculation about what the future held for games

Abbott, production editor Harry Wylie, and two writers, Jason Brookes (who would go on to edit the magazine from **E**10) and George Andreas.

"Every issue we'll be fighting to ensure you're ahead of the field for news and previews of videogames," read the editor's introduction. "And when we aren't first with a game it's because it's not worth your time… or because we'll be bringing you the whole story – not just a handful of intro screenshots and a mouthful of garbled rumour." Inside, a range of pundits made their predictions for the future of videogames, including George Lucas and Arthur C Clarke. The news pages reported Commodore and Atari's bid to enter the CD market, and the Japanese launch of Pioneer's LaserActive system, before managing to fit the release schedules for all the platforms on the cover into just two pages (not something that would be possible in today's era of videogame proliferation). Highlights included previews of *Dungeon Master II*, *Rise of the Robots* and *Virtua Racing*, features about 3DO and the impact of Dolby Surround and Qsound, and reviews of *Street Fighter II Turbo* on SNES, *Mortal Kombat* on SNES and *Gunstar Heroes* on the Mega Drive (which was unfairly admonished for a lack of secrets or hidden levels).

Reading through the first issue of **Edge**, it's clear that the videogame industry, and its attendant specialist press, were both very different to the corporate leviathans that later evolved. **Simon Byron**, now working at videogame PR agency Barrington Harvey was editor of 'The One' ("Britain's least-popular Amiga games magazine") at the time. He describes the period as "an extended episode of 'Press Gang', though with a million geeky Dexter Fletchers and no Julia Zimbabwes. Kids playing *Sensible Soccer* or *Speedball 2* for a fortnight, before thinking about what to put in the next issue. It astonished me that companies such as EMAP and Future would essentially place huge financial responsibility in the arms of inexperienced (in publishing terms) gamers with, in our case, very little managerial guidance in terms of how the magazine should progress."

Paul Davies, now a freelance game journalist, who was working on EMAP's official Nintendo magazine, 'Nintendo Magazine System' at the time, concurs, "Everyone was reviewing games from imported Japanese or American games, and crediting the supplier. Overseas news from Japan and the US was lifted from Japanese mags like 'Weekly Famitsu' and US mags like 'EGM'. It was every man for himself, and some of the older 'personalities' were still helping each other out when it came to exclusive UK-oriented reviews, competitions, and so on. It was a time of transition, to be polite about it."

Rock 'n' roll

Perhaps it's because of this that it was also a period that was bursting with potential. "You have to remember that this was the moment when videogames were suddenly the new rock 'n' roll," argues Carey. "Sony was putting them into nightclubs, Sega was throwing money around on marketing like it was going out of fashion (though in fact the reverse was true) and any hot new act that wanted to signal cool had to know their videogame stuff."

And the exponentially improving technology seemed unstoppable. "On paper, there were systems that threatened to offer all the sophistication we'd been promised by The Future," agrees Byron. "The CD-ROM, for example, implied far more than it ever delivered – but at the time, we were astonished by *Rebel Assault* and *The Seventh Guest*'s undeniably impressive eye candy." Which perhaps explains **Edge**'s decision to give quite

so much coverage to *Microcosm* ("I remember being a little concerned about *Microcosm* getting so much coverage," recalls Brookes, with the benefit of hindsight).

Future Publishing, the birthplace of **Edge**, was itself an embodiment of this turbulent slice of videogame history. "It was a pretty exciting time," relates Brookes. "There was rapid expansion due to the 16bit boom and there was a feeling that Future was unstoppable. Personally, I felt there was a warm family vibe at Future at that time – it was quite innocent. I can't believe that we didn't have the pub. Believe it or not, **Edge** was never about making money – I distinctly remember being told that very explicitly by Greg Ingham. It was about making something unbelievably, uncompromisingly brilliant. Future at the time was pretty no-nonsense in its launching; we didn't go in for focus groups or any of that nonsense. With **Edge**, in particular, we had the feeling that we were going to produce a magazine that we loved, and that the readers would respect and appreciate. It's such a cliché now but at the time it seemed fresh: if you build it, they will come."

"**Edge** was never about making money – I was told that very explicitly by Greg Ingham. It was about making something unbelievably, uncompromisingly brilliant"

internet access for the first two years of **Edge**. I remember receiving the initial specs for the PlayStation and Saturn via fax from our 'Frenchman in Japan', Nicolas di Costanzo. I think he must have copied them out of 'Weekly Famitsu' – and yet no other games magazines reported on this."

Matt Williams has similar memories. "Future was privately owned and a lot smaller, which meant we had a direct line to the boss [Greg Ingham, then Future's managing director, now chief executive] – who had a conscience. Obviously it was about making a living, but it was all about believing in the magazines, because his background was as a videogame journalist anyway. Everybody knew everybody else and it was quite tight-knit, and the videogame industry was just overflowing with potential. The technology we have now to produce the magazines is so advanced compared with what we had then; it was being produced to film, there was no digital workflow. Interestingly though that probably made us think more about what we were producing."

What they were producing was, according to Carey, "the result of a lot of conversations, many of them in

And build it they did. When Future Publishing had sold 'ACE' magazine to EMAP some years earlier, the terms of the deal prohibited the company from entering the multiformat market with a new launch for a certain period of time. According to Jarratt, it was the end of that period that kicked off the conception process. "When the agreement between Future and EMAP allowed us to enter the multiformat market again, following the sale of 'ACE', Greg Ingham and Steve Carey asked me if I wanted to launch one and I was really keen. I figured that if I was still heavily into videogames at the age of, er, approaching 30, then there'd be others like me. At that time, I was a great fan of a US mag called 'Cinefex', which is all about movie special effects. That was sort of the inspiration for a mag which went into more depth in terms of how games are made, the technical aspects, development issues – basically a mag that treated games as a serious work. It came together pretty quickly, and though the initial idea was mine, credit has to go to Jason Brookes who really helped flesh it out and bring in the import/Japanese/hardcore culture."

Or, as Brookes describes it, "Stevie J knew what he was doing. At

that point games were in an awkward development stage – graphics, and primarily FMV, were a huge distraction from gameplay. But because prerendered 3D graphics were so new and interesting, we could get away with it. Like all of us, Stevie J was a big geek. He had this big list of technically slanted features that included as much cutting edge hi-fi and home cinema stuff as possible. He loved all that. I was responsible for selecting a lot of the games for inclusion, and I think he hired me because he wanted someone keeping track of all the arcade and Japanese developments."

If that makes the creation process sound suspiciously close to improvisation compared to the focus-grouped market opportunities that characterise today's magazine publishing industry, it's probably because it was. Initially it involved creating a 16-page dummy copy of the magazine, in order to crystallise the design and type of content that would appear in the finished product, but that's as regimented as it got.

"We just made it up as we went along," reveals Jarratt. "The only approval process was between us and the publisher, Steve Carey. I had the privilege of working with Matt Williams

Edge's launch editor Steve Jarratt took inspiration from film effects magazine, 'Cinefex'

who is a great designer and our ideas just meshed – the sort of clinical tone, together with his clean, black and white design." Williams confirms this impression of a meeting of minds: "It was one of the easiest launches I've ever done," he states. "It just seemed to be right for the time and Steve and I felt really plugged in."

Still, it wasn't entirely without problems: "Finding the right staff, trying to get Brookesy to hand in his copy on time, me having no real experience of editing a mag of this type, people not 'getting' it, struggling with deadlines," is how Jarratt recalls them. "You know, the usual." And, as per usual, they were overcome.

The result was something vibrant and new; something that captured the zeitgeist of that aspirant moment, and something that stood out from all the other videogame magazines on the news-stand. "As it transpired it was launched right on the cusp of the explosion of the videogame industry into a million dollar business," relates Williams, who was largely responsible for the magazine's stand-out design. A high cover price allowed the magazine to be printed on the most expensive paper available, an attitude to presentation that extended to every part of the magazine. "It was most celebrated for its high design and production values," recalls Brookes. "We always went the extra mile to make things look nice – in the early days that meant taking photo transparencies instead of screen grabs when we wanted to do justice to a game's graphics. Matt Williams understood typography and pacing really well – in particular, the use of 'white space'. Of course, that meant that fans of traditional 'packed' mags couldn't appreciate it – 'What a complete waste of space!' they'd say. But we also had more information than any other mag out there. I think it seriously upped the ante. There was just so much information to get your teeth into, and a nice balance between celebrating gaming's history via things like retroview, and anticipating its future."

I think he came up with the guerilla-style marketing – the black bag, the billboard ads, and apparently, subliminal messages masquerading as personal ads in London weeklies. There was an arrogance at play even then."

Indeed. Carey describes this arrogant vision as, "Instead of the old 'New York Times' tag of 'All The News That's Fit to Print' it was going to be "Only If We Say It Matters'." But this apparent arrogance was quite a carefully cultured one. "Another very perverse thing we did was to severely restrict the availability of the magazine at launch," continues Carey. "Normally you try and get a new magazine out everywhere so it can be seen and sampled. Not **Edge**. I think we put it in only one in 15 of the nation's newsagents. On the first day it came out, I was fielding calls from desperate, desperate types – I remember in particular one guy who'd been into dozens of places looking for it. He was practically in tears. I think I may even have popped a copy into the post for him. I hope he's still reading: he really made my day, I can tell you."

"Normally you try and get a new magazine out everywhere so it can be seen and sampled. Not **Edge**. I think we put it in only one in 15 of the nation's newsagents"

Perhaps controversially for the time, **Edge** was launched in a sealed, opaque bag – preventing would-be readers from sampling a copy at the newsagents. And the launch was accompanied by a marketing campaign that ostensibly appeared to discourage readers. "As well as a strong team we had a pretty visionary publisher in Steve Carey," discloses Brookes. "He was bright, erudite and, if I remember correctly, a big bully. But I did admire the vision he had for **Edge** – an authoritative and damn stylish videogame magazine.

"The reason for doing it was to generate myth and mystique, and brand creation," explains Williams. "At the time, brand creation wasn't a concept that really existed, but we wanted to create an impression that the magazine was essential."

"The whole idea of the overprinted sealed bag and the 'It's not for everyone' routine was to build up a mystique," agrees Carey. "We knew we had the hardest of the hardcore videogames players reading our other mags, and we knew they were smart enough to notice what was going on. They were the opinion formers, and if we could catch their attention, others would come along for the ride."

Datastream was included to indulge publisher, Steve Carey, "It was nicked, holus bolus, from something the 'Guardian' was running at the time," he says

"We will be eternally grateful to **Edge** for being the other magazine to be seduced by *Rise of the Robots*' visuals," says Simon Byron, then editor of 'The One'

But how did the rest of the industry react to this brash, self-important, new kid on the videogame mag block? "There were two schools of thought," explains Byron. "As multiformat magazines were struggling to compete with the dedicated singleformat publications, it was obvious from the off that **Edge** would need to position itself radically in order to succeed. It did this by producing a genuinely aspirational read, promoting itself deliberately ambiguously and trading not necessarily on exclusive content but on issues which hadn't really been tackled by our press before. The second school of thought is much more succinct: we thought it was a bit up its own arse."

On balance, that second point of view was probably the predominant one among **Edge**'s competitors. "The thing that confused us all initially was how eager it was to break the mould," Byron continues. "It was sold in a sealed bag, for starters – how we laughed when we realised no one would buy it when its contents could not be skimmed in Smiths. That wasn't the case, of course; **Edge** traded superbly on this elitist reputation. Not knowing what was in it, merely reinforced the need to purchase."

Paul Davies recalls a similarly nonplussed response from his colleagues. "Of course all the senior people within EMAP were dismissive of it, this expensive mag that came in a sealed bag. But it was clear that it had its own agenda, and all the design guys liked the look of it. **Edge** was massively different from anything else out there. Clearly more mature. Nothing like what the rest of us were doing, so we didn't let it concern us."

Damaged credibility

This was not an attitude that lasted for long, however. "When we started to see interviews with some very important people in there, and when we started to see coverage of games in development that we felt we should be covering, that's when we started to take notice," continues Davies. "The whole industry-oriented approach was paying off, and we didn't see it coming. We weren't used to arranging appointments with people like Howard Lincoln, or Trip Hawkins. Actually we didn't care about Trip Hawkins, but when **Edge** was showing cool *Donkey Kong* renders we were straight on the phone to Rare, crying, and being told, 'Well, you didn't ask. Anyway, it's much too early for you.' So we felt that our credibility as an official source was being hurt."

Byron recounts a similar tale, "We immediately went to our publisher and demanded we had access to spot varnishing. And a design team that didn't rely on symmetrical grids and primary colours. I think we also got a bit fed up with the industry reaction – which was universally positive, resulting in all those damned InDin Magazine of the Year Awards."

Indeed from the very outset of the magazine's life, it was enormously well received by the videogame industry. Which wasn't without its downsides. "Unfortunately every marketing manager in every crap games company was instructed by their boss to get their games into **Edge**," explains Brookes. "So we often got duped – as with (cough) *Rise of the Robots*. Great cover though." Still, for every *Rise of the Robots*, there was a genuinely exclusive report enabled by the videogame industry's desire to see itself in the pages of **Edge**. "The mag

was so highly regarded that I'd often find myself as the only journalist invited to NDA-protected presentations and private demos," he continues. "For example Steve Jarratt and I were the only journalists in the world to see the pre-production PlayStation hardware up and running almost a year before it came out."

Part of this favour and patronage was because the industry itself was as keen to reposition videogames as a respectable form of entertainment as **Edge** was. "It was so heartily welcomed by the industry; it really opened doors for the rest of the group," explains Williams. "It was a calling card. I think it had such an impact because the industry wanted to justify its existence. I think they wanted to see themselves in it, and it was where you go to first to find out what's going on in videogames. It became a focal point for the industry, and the letters were really good, and when it evolved into an outlet for recruitment advertising, developers made an effort to design adverts to look really nice, which shows some of the mag's influence, since they knew that we probably wouldn't take their ad if they designed a shit one."

The evolution of **Edge**'s recruitment section is just one example of how the magazine has developed to encompass the seismic changes that have shaped the videogame industry over the past ten years. The magazine today is very different to the one that launched in 1993. "Initially we gave too much space to dodgy FMV adventures at the expense of really good, playable 2D stuff," says Brookes. "I think the mag's increasing retro slant these days acknowledges that to some extent. And I have to say, I was probably responsible for the over-concentration on specifications in the early days. I couldn't give a crap about stuff like that today – it's all become so meaningless."

"Developers made an effort to design adverts to look really nice, since they knew that we probably wouldn't take their ad if they designed a shit one"

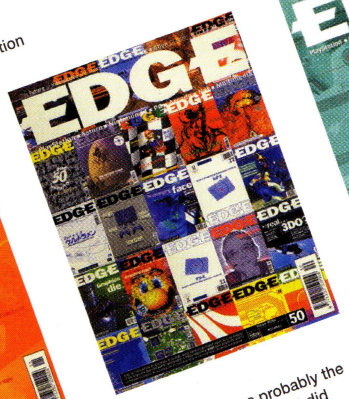
As a testament to the achievements of the handful of people who put that first issue together, it's worth noting that, of the magazines around a decade ago, only 'C&VG', 'Official Nintendo Magazine', 'GamesMaster' and 'PC Gamer' remain. A sister magazine to **Edge**, 'NextGen', was launched in the US in January 1995 but closed its doors in January 2001 having won praise from various quarters, including 'Time' magazine, 'USA Today', 'The Wall Street Journal' and ABC News. "It's certainly true that many people dislike **Edge** and its attitude and influence," concludes Byron. "But had it never launched, I do think that the standards of specialist press journalism would have remained as poor as they were when I was doing it." Which certainly looks like a compliment.

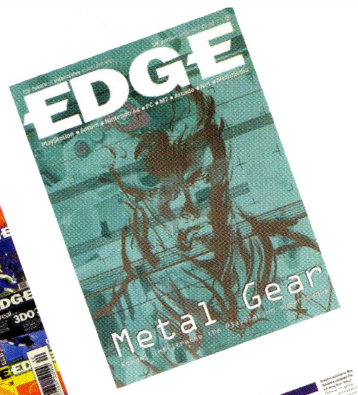
Having gone on to bigger and better things, the members of the launch editorial team that **Edge** spoke to are justifiably proud of their achievement. "When I see it on news-stands here in Australia, I still feel immensely proud that I played a part in it," declares Carey, "even though that was sometime in the last millennium. How could you not feel proud? Just last week I suddenly won new respect and admiration from an IT lawyer down here in Australia, because I played a part in the launch of **Edge**."

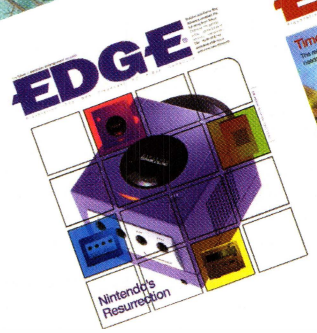
Brookes also looks back on the period with satisfaction, "It put a traditionally maligned pastime into a cooler perspective. It educated people rather than feeding them a diet of hype. And perhaps best of all, it really started to question why we should be accepting games of such a pitiful standard – back then, 90 per cent of games were unplayable."

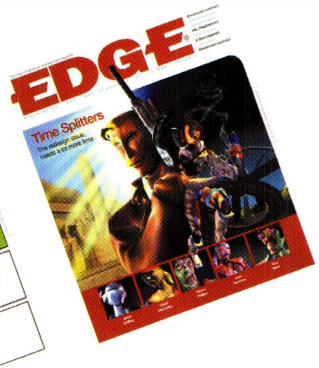
But perhaps the last words ought to be left to the magazine's launch editor, "I wanted to make a mag that catered for serious, passionate gamers," finishes Jarratt. "A magazine that would outlive the various hardware generations; that was a showcase for the very best that the industry had to offer; and a mag that sold about 100,000 copies a month with loads of advertising. Well, three out of four…"

Covers that never were: a (limited) selection









"I don't think anyone would argue with me when I say I was probably the least organised editor in Future's history" says Brookes. "But that did mean we made some killer issues by cramming in stuff at the last minute."

Tales from the Edge

A round-up of some of the stories that weren't fit to print

No animals were hurt in the production of this cover

The high production values that go into **Edge**'s covers are the work of an art department that operates like a well-oiled machine. But in ten years, there has been the odd occasion where things haven't quite gone according to plan, as **Edge**'s erstwhile art editor, **Terry Stokes**, explains. "On one occasion we decided to use a fox on the cover, and have it wearing flying goggles, with the *Star Fox* game reflected on them, as if it was playing the game. I briefed our photographer, and over the next couple of weeks he let me know that he'd found a toy shop in Birmingham that supplied cuddly toys, and an antiques market to get hold of some flying goggles. Things were all going to plan. When I went to the studio I was met by a very pleased looking photographer. And there it was. It looked like a cross-eyed Roland the Rat complete with flying goggles, hat and scarf. I was speechless. It was okay though, because our photographer had a back up plan…

"The next thing I knew, I was stood in front of a thawing fox that had been in our photographer's freezer for the last two days, complete with goggles, hat, scarf and a bullet-hole from where it had been shot in the head. It turned out that he'd asked his cousin, who was a hunter, if he happened to have a real-life fox that could be used for the photo shoot. While our photographer was cracking its limbs in an attempt to make it look like the fox was holding a joypad I had to explain we wouldn't be able to use it…"

We could be heroes

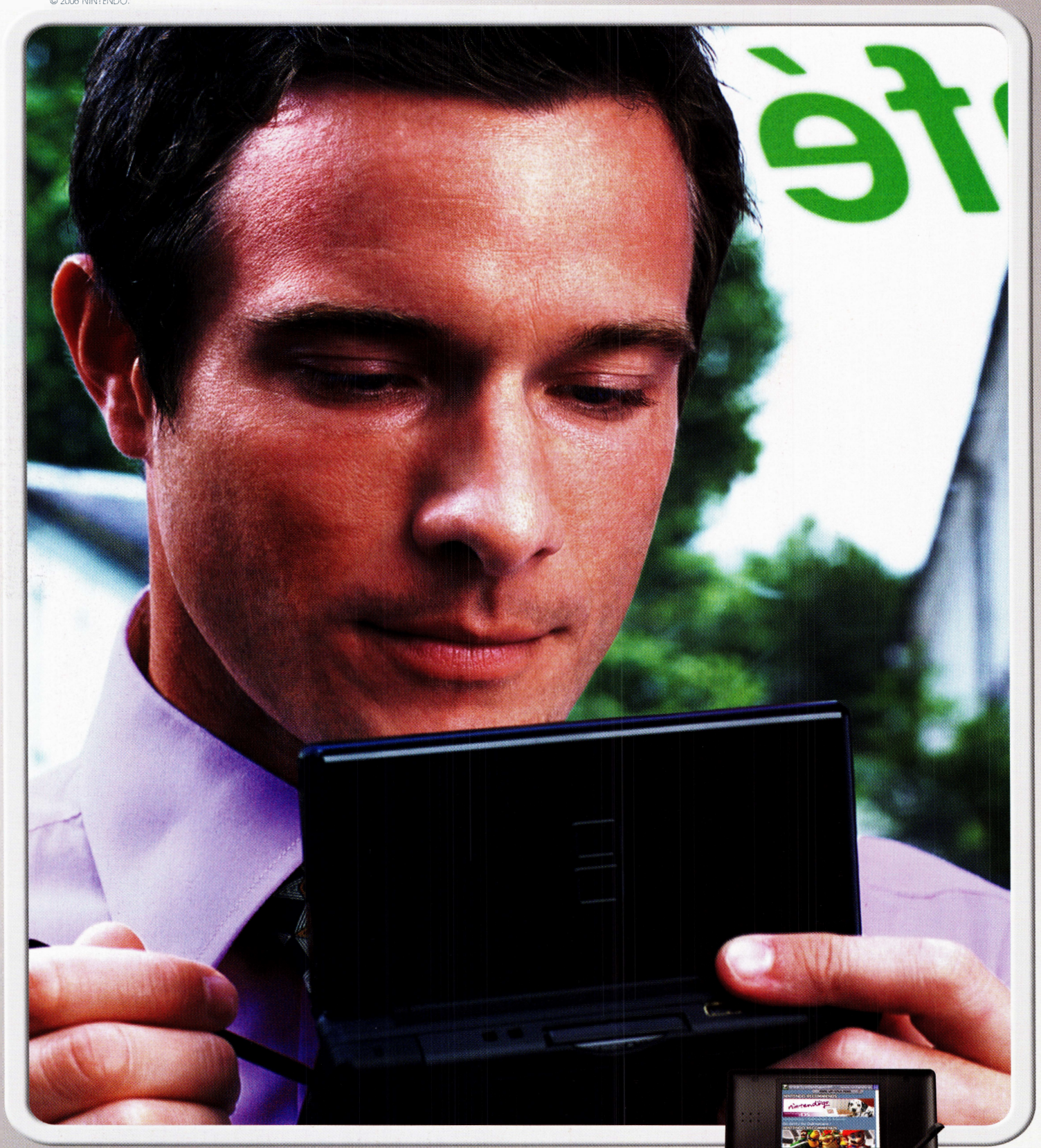
Edge magazine has provided some unique opportunities for its staff to meet their heroes. For Matt Williams, those heroes were Malcolm Garrett and Peter Saville, who designed the 'Never Mind the Bollocks' cover. "They were like gods when I was at college. But when Malcolm Garrett wrote a book called 'The Hyperspace Lexicon' about multimedia and interactivity, and the magazine was featured in the book, I eventually got to meet him and we chatted about **Edge**, which was really cool."

For Jason Brookes it was Shigeru Miyamoto, "I was once at a private CES party on a river in downtown Chicago with a load of people from Rare, Alias and Nintendo. There were no other journos there so I spent most of the night sitting under the stars with Miyamoto-san smoking all his ciggies. The poor guy probably just wanted some peace."

And for Paul Davies, working on 'NMS' at the time, it was Jason Brookes, "At Space World 1995 I remember seeing Jason Brookes casually chatting with Miyamoto and thinking 'how the… what the… ?!' and being obsessed with Jason's incredible ligging prowess ever since. In fact, I've got a better one: the time that Jason went to the African Rally with Mizuguchi from Sega. Or maybe I just imagined that… My trophies at the time were books about *Street Fighter* costing me £30 from the Japan Centre. Jason's were Kutaragi-san's business card… before he invented PlayStation probably. Maybe it's about time I dropped this obsession with Brookes!"

The One and only magazine of the year

Edge wasn't welcomed in all quarters when it launched ten years ago. In a brazen display of the sort of self-promotional skills that were eventually to earn him **Edge**'s 'press release of the year' award in 2002, Simon Byron, then editor of 'The One' decided to take a stand. "The industry's sycophancy when it came to the press's goody-two-shoes new boy did rankle. Plus, it was always banging on about its successes in this award and that award; so I decided to poke a little fun at it. We ran a cover flash which declared: "Magazine of the Year – See Inside!" Sure enough, in the news pages, we reported briefly on **Edge**'s inevitable triumph at the InDin. The implication, obviously, was that we'd won Magazine of the Year, as we should have. It was a bit cheeky, but all good-humoured. We heard that the **Edge** boys took it in the spirit it was intended. 'Amiga Action', however, threatened to take us to court if we ever tried 'passing off' again. We told them to pass off themselves." Indeed it's an episode that stuck with Steve Carey, **Edge**'s launch publisher. His reaction? "Cheeky bastards."



After 10 minutes on Web Browser, Scott had checked his work emails, caught up on the day's news, checked his fantasy football team, and sent a joke about the armless octopus to his mates.

www. browse to play

NINTENDO DS™ Lite

We know who you are

We **know** you're a dedicated videogamer who thirsts for knowledge on the very latest titles

We **know** you're only interested in the very best the gaming world has to offer

We **know** you're hungry for information about the next wave of gaming technology

So we **know** you're going to love EDGE

This magazine is brought to you by dedicated, hardened gameplayers and experts in all fields of videogaming technology. As well as extensive coverage of what matters in the Mega Drive, Super Nintendo and PC markets, **Edge** taps into a huge underworld of videogame entertainment that simply isn't covered anywhere else. It answers questions other magazines don't even know how to ask...

Just how are the latest games being created? **Edge** is first to speak to the designers behind *Microcosm*, the groundbreaking CD-ROM game from Psygnosis. The interviews start on page 70.

What machine will you be playing on next year? Only one magazine in the UK has been permitted inside the 3DO company to see their revolutionary new Interactive Multiplayer – and you're holding it: the full inside story on 3DO begins on page 48.

What special techniques are being developed to make games even better? No-one else has even mentioned that SNES *King Arthur's World* has Surround Sound music and effects. **Edge** tells you exactly how it was done – and why it's important. Find out on page 60.

Every issue we'll be fighting to ensure you're ahead of the field for news and previews of videogames. And when we aren't first with a game, it's because it's not worth your time... or because we'll be bringing you the whole story – not just a handful of intro screenshots and a mouthful of garbled rumour.

We'll cover the best stories, in more detail, with more information than anyone else. Depend on it.

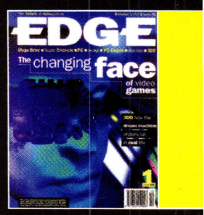
Yes, **Edge** is expensive. But information doesn't come cheap: in this first issue alone, hundreds of manhours were spent visiting software houses across the US and throughout Japan, talking to programmers and designers, investigating news stories around the world.

And, above all, we take videogames seriously. The UK market for games is now worth over £600 million – getting on for twice the entire CD audio market. So **Edge** will be making sure you know the truth about the hardware, the software, and the people who make the decisions affecting the games you play.

Finally, as is quite obvious, **Edge** isn't for everyone. But if you think it's for you, perhaps you'll take a minute or two to fill out the questionnaire (page 111) and tell us what you feel about this first issue. Seriously, we want to know.

Welcome to **Edge**. Now get in there and enjoy the magazine!

The **future** is almost here...

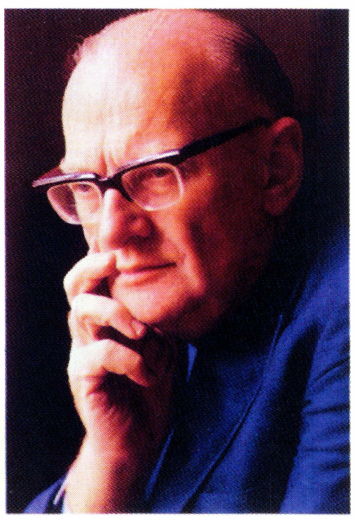


E1's editorial intro sets out a clear stall, distinguishing the magazine from the countless other multiformat titles that preceded it. Interestingly, it differs from the format used for E0 (never made available on the newsstand) by excluding a photo of the magazine's editor. Too 'chummy'? Maybe.

The shape of things to come...

Some conflicting views on the future of interactive entertainment. Dangerously addictive alternate universes; content that is shaped by its users; movies the viewers will 'play'; episodic gaming; the rise of an information super highway; and virtual reality: whose predictions will ultimately come true?

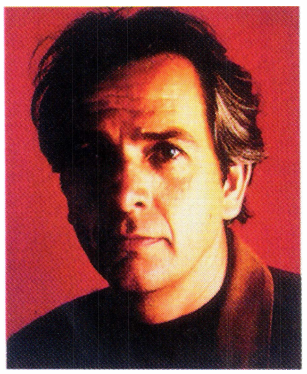
Everyone has an opinion of what the future holds, but some people are closer to it than others. **Edge** spoke to the visionaries



'I have an ambiguous attitude to videogames: they can be a good thing, but also very addictive – I myself was addicted – to *SnakeBite* on my Apple II about ten years ago.

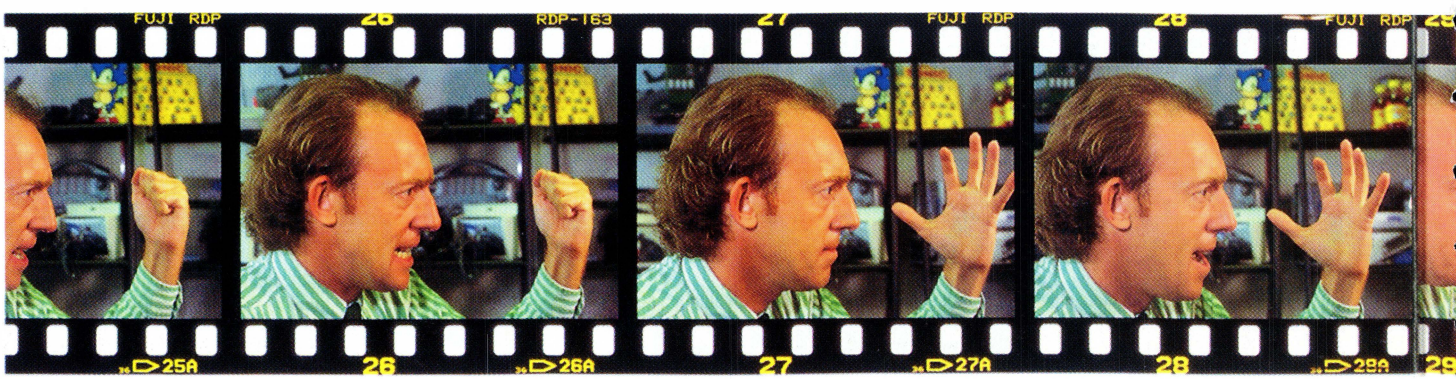
'I regard the addictive nature of virtual reality as a *real* danger. Of course it could be a shortsighted view: if we are plugged into the whole universe, why should we unplug ourselves?'

Arthur C. Clarke



'It's a new world. In about five years CD-ROM is going to absorb entertainment, education and information. There's a growing palate of what I call **enabling technology**, which allows the consumer to think of himself as the artist.'

Peter Gabriel



Games aren't going to be played by the 13 yearold shut away in his room; they're going to be

connective, interactive.

I foresee a day when you go to a movie theatre, there's about 300 people there, and between you, you all play the movie. From your seats, you control what happens. The technology is here today ...

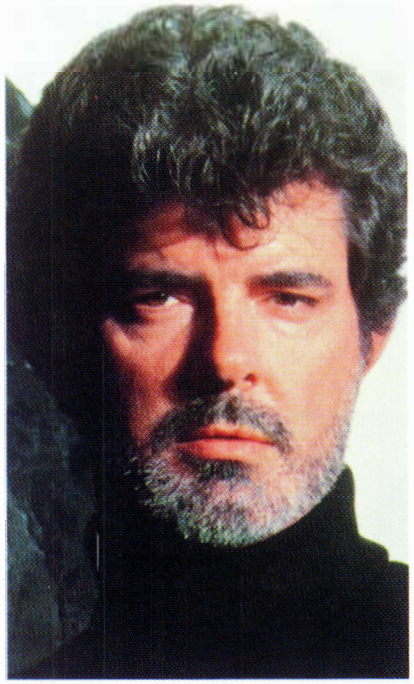
Mark Lewis, president of Electronic Arts

'Within a few years from now, we'll start to see cable and satellite

direct broadcast games

where you select from a menu of games and it'll constantly download new parts of the game into your machine while you're playing.

Jez San, MD of Argonaut Software



'Telephone and cable companies will lay the

information super highway

and it will be one of the greatest technological developments of the 20th century. But someone will still have to fill up the highway. It won't be a new entertainment form, but a more sophisticated version of what exists now.'

George Lucas, movie director/producer

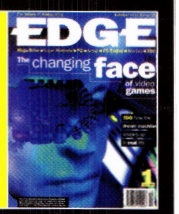
'I think incredibly

sophisticated virtual reality

is the future. Experiences that somehow tap into the mind and are controlled by your thoughts, rather than any hardware, must come somewhere down the line.

Nick Alexander, MD of Sega Europe

News



A lead news story talks of a Sega entering its most ambitious phase to date, lining up networked game delivery services, revolutionising the concept of arcade gaming in the UK, and cooking up a powerful-sounding new 32bit console. This, it's said, is about being a "multimedia leisure company".

SEGA: pirates of the airwaves?

Talk back

'The Mega CD player is a *Sonic* player, a *Donald* and *Mickey* player. With an inexperienced gamesplayer, you cannot afford to present radical gameplay options.'
Ian Heatherington, co-MD of Psygnosis defending the simplistic gameplay of *Microcosm* and *Dracula* (full Edge interview, page 79).
'The original scenario had to be approved by Spielberg... One thing Spielberg didn't want was another straight shoot 'em up or platform game.'
Programmer Andy Miah on *Jurassic Park*. Of course, would Steven know the difference? (See *Jurassic Park* prescreen, page 40).
'A Panasonic [3DO] player was running a car race game and the demonstrator told me it was a 'working' player. I pressed the disc Eject Button. There wasn't even a disc in the tray.'
Journalist Barry Fox on 3DO's dubious demo system (world exclusive 3DO feature, page 50).

Sega would like you to believe that they've taken over your TV. Funny as it sounds, that's just what they'll be doing when the Sega Channel starts beaming games directly into your black box. It's happening in the US and Europe won't be far behind

Pretend TV piracy, or have Sega really got the kit to turn the videogames world on its head? Virtual theme parks, a 24-hour Sega Channel, the 32-bit Saturn console, a new multiplayer modem – this is the stuff that electric dreams are made of. Edge tunes in...

Sega's weird and wired Mega CD ads have the premise that Sega has taken over your TV, invaded your life, become common culture currency, and not just a reasonably successful console manufacturer. Ridiculous. Or is it?

Sega is looking to move out from under the TV and right into your hearts and minds with ventures that will be impossible to ignore. It is already planning to create what that Pirate TV ad was hinting at: a Sega Channel. The firm has linked up with **Time Warner** (the largest entertainment company in the world) and **Tele-Communications Inc** (TCI) in the US, and together the companies are launching a new cable television company to pump Sega games through a decoder box directly into the TV on a special channel.

The project begins in earnest in September with trial runs in 350,000 households across 13 US cities. The cost of subscribing is $10-$15 (£7-£10) a month, plus $20 (£30) for a lead linking the Genesis cart slot and the cable TV receiver.

Ultimately, Sega could have access to 20 million cable TV owners in the States – and Europe may not be far behind. European product director **Barry Jafrato** told **Edge**, 'The penetration of cable isn't high enough in the UK, but you can do exactly the same thing using satellite technology.

'We're already talking to a number of satellite broadcasters, including BSkyB, of →

Sega World's mascot – not the best bloke to play with a beach ball

Attract mode

Every month, Edge will be paying homage to the miniature film industry that is ingame attract modes.

First in the series is *Silpheed* (see testscreen, page 94). This amazing looking Mega CD title boasts a 3D rendered intro which wouldn't look out of place in The Last Starfighter. We join the action just after you've boarded your ship...

1 **(Scene 1) Inside the belly of a carriership, the camera pans around your heavily armed fighter – an SA-77 Silpheed. The camera view swoops up and overhead, as the ship begins its descent down a dizzying shaft to the docking bay beneath**

(Scene 2) Cut to an overhead view of the ship, as the docking bay doors slide slowly apart. The inky blackness of space resides beyond, with a scrolling backdrop of twinkling stars. Cut to a forward view of the craft as it stops its descent

2

3 **(Scene 3) With the doors fully open, the SA-77 ship is lowered into the void on a giant lever assembly. The camera pans around, showing off the sick 3D visuals, as the ship finally comes to rest and is locked in place**

head to head

'My friends over at Sega haven't found a market for CD at $299. [Mega CD] is dead in Japan, dying over here [the US] and suffering in Europe'

Peter Main, Marketing vice-president, Nintendo Of America

'Right now, in this marketplace, Mega CD is an advanced machine. It's a very big step ahead of the Mega Drive. But of course, it's not the end of the story'

Nick Alexander, Managing Director, Sega Europe

Centre of attraction

It's big (24,000 sq ft to be precise). It's down by the sea. And it's got all the hottest Sega arcade titles. What is it? Well, it's called Sega World and it's in Bournemouth.

As well as all the latest Sega arcade titles (*Virtua Racing* and *Title Fight*), you can have a go at *Sonic Strike* (a scaled down ten-pin bowling alley), get your Sega goodies at the Sega Shop and even have a snack at the built-in Burger King.

There'll be more and more of these centres popping up all over the country, and a similar, smaller Sega World games centre is already planned for Colindale in North London.

← course. There would be a decoder box available and the channel would be accessible to anyone that had a dish.

'In a similar style to movie channels, there would be 20 or 30 back catalogue titles available but also one- or two-level previews of newer games.'

The European Sega Channel will not be in operation this year, but a mid-1994 launch is possible.

About the

same time we will see the benefits of Sega's recent link with W Industries, virtual reality pioneers. Headed by the enigmatic Dr **Jon Waldern**, W Industries is the company behind the coin-operated virtual reality systems at the Trocadero in Piccadilly.

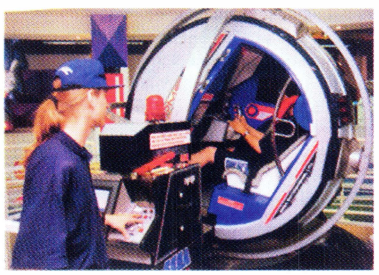
The WI/Sega project is being kept under wraps at the moment, but it will probably first take shape in the form of laser-disc 3D cabinets, initially appearing in Sega's new games centres. The European roll-out for games centres featuring huge simulators and mind-blowing VR is, according to Jafrato, 'as fast and as frequent as we can find the out-of-town sites'.

This new style of arcade, called Family Entertainment Centres, are next on Sega's list of world-dominating activities. They are already hugely popular in Japan and the first European FEC has just opened in Bournemouth, covering a floor space of over →

Who is it?

This person was born in Pasadena, California. At high school he created his own discipline, majoring in strategy and applied game theory. He designed games and knew he would start his own company; he even knew when – 1982

A computer image of the Driving Edge Zone, showing the position of Sega's *Virtua Racing* and *R-360* coin-ops

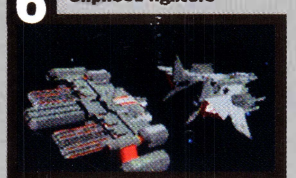


And here's an *R-360* at Sega World just waiting for you to go and shove all of your hard-earned money into it

4 (Scene 4) Cut to a wide angle view. The camera pans down, revealing another identical Silpheed SA-77 ship in the distance. It becomes clear that yours is not the only one being prepared for the impending battle

5 (Scene 5) Close-up on rear section of SA-77 as the boom arm disengages and moves out of view. The Silpheed's twin engines kick into life, glowing with fiery energy. Cut to a wide angle as the fighter slips silently away from the massive carriership

6 (Scene 6) The camera pans around as your ship blasts through space. In the distance you can see other carriership, making up a substantial fleet. Each of the carriers is also releasing its cargo of Silpheed fighters



7 (Scene 7) Cut to a point in space ahead of the fleet. With the carriership in the background, a swarm of SA-77's buzz the camera in a dramatic flypast. The fighters hurtle past and shrink into points as they head for their destination and the battle to come. Game on...

Continued next page

News

← 20,000 square feet.

On a global scale, Sega is already a major player in the arcade market. It currently operates well over 1,000 Amusement Centres worldwide. But the FECs are a big step forward from those centres. Jafrato explains: 'These are not places for wayward youths. These are for the whole family, with cafes and shopping, things like that. They're also huge, designed to feature machines like the AS-1 and R-360 in the sort of space that they need. They'll be more like our own mini-Disneylands.

'But there won't just be Sega machines, there'll be over 100 different machines with all the most popular titles from other manufacturers, like *Street Fighter II* for instance.'

The centres will also feature the new arcade version of *Sonic*, cased either in its own custom cabinet or as a slot-in board for a standard cabinet.

The Family Entertainment Centres are just the tip of Sega's entertainment iceberg. Sega of Japan has been busy headhunting executives in preparation for virtual reality theme parks, the first of which is due to open in Osaka at a cost of ¥3 billion (£19 million). Sega hope to have 50 such theme parks in Japan by 1997, and more in Europe and the US.

Virtual reality will be playing a big part in the future of these new centres. And the deal with W Industries lies at the heart of this expansion, as Dr Waldern explains; 'We're licensing our operating system to them, and linking up all their hardware to make it run effectively. We're also writing all the games to go on their new platform.'

The deal between the two companies is worth £3·2 million over two years. The earliest manifestations of Sega's virtual reality kit will be in its games centres, or as Waldern describes them, in Location Based Entertainment (LBE) centres. But work is also underway on games for the home.

Waldern is unequivocal on the future of the games scene generally. 'Television and video technology will merge. Multimedia itself will merge into that, in other words multimedia will provide the inherent technology for home and interactive TV, interactive games. They'll all become one and the same thing. That'll all get linked up on Networks, except in the UK, because we're all so backward here.'

'Soon everything will all be linked up on Networks – except in the UK, because we're so backward here... '

Jon Waldern, chairman of W Industries

But how will all this affect your humble Mega Drive, the not-so-humble Sega VR peripheral and the not-very-humble-at-all 32-bit Saturn console?

The biggest impact will be on Sega itself. Consoles have been growing fast these last few years, but it can't last forever. Sega is establishing itself in other markets; it's all about eggs and baskets. As Jafrato concludes, 'we're not just a console company, we're a multimedia leisure company'. And who's to argue?

it is...

Trip Hawkins. The company he founded – Electronic Arts – went on to become the biggest publisher of leisure software in the world. He then left EA to found the 3DO company, which has yet to sell a single unit, but is worth $300 million

Continued

Separated at birth...

The first in an on-going series, in which Edge highlights some of the startling similarities between games currently on sale, and some that appeared months, if not years, ago

Final Fight

Released: Spring 1991
On: Super Nintendo
From: Capcom
Style: Scrolling beat 'em up
Source: Coin-op
Players: One
Features: Bosses, special moves, bonus stages
Problems: Limited, too easy

Batman Returns

Released: Spring 1993
On: Super Nintendo
From: Konami
Style: Scrolling beat 'em up
Source: Movie licence
Players: One
Features: Bosses, special moves, bonus stages
Faults: Too easy, limited

Next stop... Saturn?

Sega's next-generation machine, the Saturn, boasts a 32-bit RISC chip running at 27MHz, 24-bit graphics and, not surprisingly, a polygon generator.

This chip can display and animate 16,000 polygons per second – which doesn't sound so impressive in comparison to *Virtua Racing*'s 180,000 polygons per second.

Interestingly, the Saturn graphics chip also includes an alpha channel for transparent colours and digital compositing – ideal for games containing video footage.

Considering the amount of information needed to feed these data-hungry processors, rumours of it being a CD-only machine had better be true.

However, given the considerable slippage of the Mega CD, Sega's planned launch date of 1994 seems unlikely.

Data stream

Number of games sold in average shop 15-22/12/92: **153·3**[1]
Number of games sold in average shop 18-24/07/93: **50·1**[1]
Value of UK console market 1992: **£566m**[2]
Value of UK console market 1993: **£750m**[2]
Value of UK CD market 1992: **£345m**[3]
Value of UK video sell-through market 1992: **£444m**[4]
UK annual console sales in Nov and Dec: **70%**[2]
US Game Boy sales to over 18s: **40%**[5]
Number of Master Systems in UK 1/01/93: **1,100,000**[6]
Number of NES units in UK 1/01/93: **1,150,000**[6]
Number of Mega Drives in UK 1/01/93: **1,050,000**[6]
Number of Super NESs in UK 1/01/93: **600,000**[6]
Mega Drive launched in UK: **August 1990**
SNES launched in UK: **April 1992**
Number of Game Gears in UK 1/01/93: **400,000**[6]
Number of Game Boys in UK 1/01/93: **1,253,000**[6]
Worldwide sales of *SF II* (launched June 1992): **6,000,000**[7]
Nintendo pretax profits 1992-93: **¥163·7bn (£1bn)**[8]
Number of Nintendo employees: **900**[9]
Profit per employee: **£1m+**[9]
Companies in Japan more profitable than Nintendo: **1**[9]
Growth of Nintendo 1992-3 over 1991-2: **4·8%**[9]
Growth of Sega 1992-3 over 1991-2: **64%**[9]
Copies of **Edge** one printed: **47,667**

Sources [1]Gallup Chartalk; [2]Euromonitor Market Research Report; [3]*Observer* report 11/10/92; [4]*British Film Institute Film And TV Yearbook 1993*; [5] Nintendo of America; [6]CTW market share reports; [7]Capcom President Kenzo Tsujimoto, Nikkei Weekly; [8]Original estimate by Euromonitor of £1.1bn revised downwards by **Edge**; [9]Nikkei Weekly 12/7/93

PC Engine powers-up

The PC Engine Duo and Duo-R are to get a huge boost in performance from a new RAM card being developed by NEC.

16 megabits of DRAM will be included on a new system card which effectively increases the available RAM from a measly 2 megabits (256K) to a vast 18 megabits.

The card will be released in December at ¥12,800 (£82), with Hudson Soft converting SNK's *Fatal Fury 2* (above), *World Heroes 2* and *Art Of Fighting* to take advantage of the new large-memory format.

Fatal Fury 2 will be out before the end of the year and all Hudson's games are expected to cost around ¥6,000 (£38). Current screenshots are looking better than the SF conversions, too.

Sega unveils The Edge connector

Sega users in the US will soon be able to get a device that enables them to play games against their friends over the phone. It's called The Edge (no relation), and it's the result of an agreement between Sega and US telecommunications giant, AT&T.

Made up of a modem and a speaker phone, The Edge can also transmit voices so you can talk while you play. It plugs into the game slot on the Sega, and then into the game cartridge and the phone socket.

The Edge also has four slots on the front for memory cards so you can save gameplay. Electronic Arts, Tengen and Sega themselves are all planning to make their games 'Edge-compatible'.

The Edge will be available in the US by next summer at a retail price of between $100 and $150 (£65-£100). A UK launch is likely soon after.

The Edge connects Mega Drive players over the telephone lines

i wish...

Archer Maclean

'... that Japanese 16bit consoles had the internal design structure of the A1200, instead of the ridiculous bottlenecks and hardware restrictions they all share. I can see the historical reasons and economic reasons for this evolution, but it really gives us games designers/programmers a headache.

'The PC is almost as bad. The theoretical processing power of a leading edge PC is phenomenal, yet it is hampered by having to retain compatibility with some ancient architecture from 10 years back, and all sorts of bus speed restrictions, and datapath widths etc.

'It's almost like a mechanic putting a Formula 1 engine into an ordinary Citröen 2CV with skinny little wheels. PC hardware designers have come up with all sorts of fine-tuning methods and turbocharged solutions for various hardware areas, but if they started with a fresh sheet of paper, the processing power-to-cost ratio (and future compatibility solution) could offer one small step for man, and one bigger leap for PC Power.'

Archer Maclean is the man behind *Dropzone*, *Jimmy White's Whirlwind Snooker* and *Archer Maclean's Pool*. He's currently working on the Mega Drive version of *Snooker*, *Pool* on various PC platforms and is helping on the design of an eight megabit version of *Super Dropzone* for the SNES. The original eight-bit *Dropzone* will also be appearing on Sega's Master System and Game Gear.

Bad press

Taking one week at random, Edge monitored the press for their videogame coverage. Here are two of the more depressing 'highlights'

'Boy gives kid the elbow

One of Britain's best young tennis hopeful (hopeful being the operative word here, presumably) has been banned from playing with his Game Boy and Super Nintendo after he ended up in agony.

Sports osteopath **Raymond Perrin** said: 'I'm sure the injury was caused by excessive use of videogames.' Oh well, that proves it beyond all doubt then...

source: Clwyd Evening Leader, 10/6/93

Sega World worries

Parents are concerned by the possible financial and psychological damage that could be caused by Sega World (see news story, page 12).

So says the Independent, anyway, though it doesn't actually quote any of these desperately concerned parents as such. It does, however, quote **Ian Brown**, psychologist at Glasgow University, as saying that studies prove that a 'significant minority' of people will become addicted to videogames.

'If the addiction is not fed,' he warns, 'it can lead to delinquent behaviour. More research is needed' – now there's a surprise – 'and parents are right to be cautious.' Right Ian, the grant's in the post...

source: Independent, 12/6/93

Night Trap nightmares

Mother of three **Jacqueline Nicholls** organised a protest against Sega's Mega CD game *Night Trap*, not on the entirely reasonable grounds that it was crap, but because her children (12, 11, 8) 'suffered nightmares after seeing scenes from the 15-certificate film during a shopping trip.'

Mrs Nicholls also met her MP **Tony Marlow**, and said the meeting had gone 'very well.' Mr Marlow said he'd written to the Home Secretary and the Trading Standards about it, 'but he had not heard anything from them.'

Clearly a man who can get things done.

source: Northampton Chronicle & Echo, 14/6/93

'Mario made me an addict'

Embarrassing halfpage in one of the alleged quality papers: middle-aged hack tries videogames, likes them. Shock, horror. Final sentence: 'There is no alternative: I shall play *Dr Mario* one last time and then I shall panic.' Oh you are a card, etc.

source: Independent, 16/6/93

Continued next page

Jungle Strike Mega Drive **Night Trap** Mega CD **Starwing** Super Nintendo **Syndicate** PC **Day Of The Tentacle** PC CD-ROM **Syndicate** PC **Puyo Puyo** Mega Drive (Japan) **Street Fighter II Turbo** Super Famicom (Japan) **Micro Machines** Mega Drive **Final Fight** Mega CD...

Charts

The very latest **charts** from across the entire world of videogaming

A look at the bestseller lists for various formats in both the UK and Japan sees Electronic Arts dominating the domestic landscape (bringing about the interesting editorial line: 'Once EA finds a winning formula it never lets go does it?') and the PC charts separated between floppy disk and CD-ROM releases.

Mega Drive

1. **Jungle Strike** Electronic Arts (£45)
2. **Micro Machines** Code Masters (£35)
3. **Cool Spot** Virgin (£45)
4. **Flashback** US Gold (£45)
5. **PGA Tour Golf 2** Electronic Arts (£40)
6. **Ecco The Dolphin** Sega (£40)
7. **Tiny Toons: Buster's Treasure** Konami (£40)
8. **Super Kick Off** US Gold (£45)
9. **Sonic The Hedgehog 2** Sega (£40)
10. **Fatal Fury** Sega (£45)

Mega Drive

***Jungle Strike*: EA does sequel shuffle again**

Once EA finds a winning formula it never lets go does it? But who can blame them when Sega players keep picking up the sequels?

The well impressive *Jungle Strike* hogs the number one slot (until NHL '94 slides in for the tackle) and PGA 2 is still at number 5.

Looks like MD fans are wising up: there's precious little trash in the top ten these days – if only the same could be said about the Mega CD chart...

SFC (Japan)

1. **Street Fighter Turbo** Capcom (¥9,980)
2. **Super Mario Collection** – Nintendo (¥9,800)
3. **Pro Wrestling** – NCS (¥9,800)
4. **Madara 2** – Konami (¥9,800)
5. **SuperScope 6** – Nintendo (¥9,800)
6. **Yoshi's Cookie** - Bulletproof Software (¥6,600)
7. **Super Mario Kart** – Nintendo (¥8,900)
8. **Super Air Diver** – Asmik (¥8,900)
9. **Super Formation Soccer II** – Human (¥8,500)
10. **Yoshi's Safari** – Nintendo (¥6,500)

Amiga

Fullprice games (and they are *very* full price) dominate the top slot.

However, the 'significantly cheaper but still not budget' Team 17 continue to place highly, with their very polished and dead playable titles.

Utterly predictable, utterly brill: *Syndicate*

Amiga

1. **Syndicate** – Electronic Arts (£35)
2. **Goal!** – Virgin (£31)
3. **Gunship 2000** – Microprose (£35)
4. **Project X** – Team 17 (£13)
5. **Championship Manager 93** - Domark (£26)
6. **World Class Cricket** – Audiogenic (£30)
7. **Flashback** – US Gold (£31)
8. **Alien Breed: Special Edition 92** - Team 17 (£11)
9. **Dune 2** – Virgin (£31)
10. **Sensible Soccer 92/93** - Renegade/Mindscape (£26)

MD (Japan)

1. **Puyo Puyo** Sega (¥4,800)
2. **Night Striker** Taito (¥7,800)
3. **Ex Ranza** Gau (¥6,800)
4. **Illusion City** Cabin (¥4,980)
5. **Fatal Fury** Sega (¥8,800)
6. **Switch** Sega (¥8,800)
7. **Devastator** Taito (¥7,800)
8. **Sega Classics** Sega (CD) (¥2,980)
9. **J-League** Sega (¥7,800)
10. **Golden Axe III** Sega (¥6,800)

PC

1. **Syndicate** – Electronic Arts (£45)
2. **X-Wing: Imperial Pursuit** – US Gold (£20)
3. **Sensible Soccer 92/93** – Renegade/Mindscape (£33)
4. **Populous & Promised Lands** – Hit Squad (£14)
5. **Fields Of Glory** – Microprose (£45)
6. **X-Wing** – US Gold (£46)
7. **Day Of The Tentacle** – US Gold (£43)
8. **Flashback** – US Gold (£38)
9. **Terminator 2** – Hit Squad (£10)
10. **The Simpsons** – Hit Squad (£10)

Mega CD

1. **Night Trap** – Digital Pictures (£50)
2. **Final Fight** – Capcom (£45)
3. **Road Avenger** – Renovation (£40)
4. **Robo Aleste** – Compile (£40)
5. **Sherlock Holmes** – Sega (£45)
6. **Time Gal** – Wolfteam (£40)
7. **Jaguar XJ220** – Core Design (£45)
8. **After Burner 3** – Sega (£40)
9. **Prince of Persia** – JVC (£45)
10. **Black hole Assault** – Sega (£40)

PC

Day Of The Tentacle reigns supreme at the top of the CD-ROM charts, and also maintains a healthy position at number 7 amongst the floppies.

CD titles do seem to follow an unsettling trend: apparently you can't do much else on silver disk but adventures and murder mysteries...

On floppy, it's sad to see *Terminator 2* rearing it's ugly little head. At ten quid, it's still overpriced.

***Day Of The Tentacle* – sheer CD-ROM class**

SNES

1. **Starwing** – Nintendo (£50)
2. **Alien 3** – LJN (£50)
3. **Super Star Wars** – JVC (£50)
4. **Super Mario Kart** – Nintendo (£40)
5. **Tiny Toons: Buster Busts Loose** – Konami (£50)
6. **WWF Royal Rumble** – LJN (£60)
7. **Cybernator** – Konami (£50)
8. **PGA Tour Golf** – EA (£45)
9. **Desert Strike** – EA (£45)
10. **Pebble Beach Golf** – T&E (£50)

SNES

No surprises here, and deservedly so: they're all good titles, and show the SNES off to the full.

Rumour has it that *Starwing* has bombed in the US and Japan: overhype perhaps?

***Starwing* – still the fave of UK gamers**

PC CD-ROM

1. **Day Of The Tentacle** US Gold (£46)
2. **The 7th Guest** Virgin (£70)
3. **The Fate Of Atlantis** US Gold (£46)
4. **Ringworld** Accolade (£40)
5. **Eric The Unready** Accolade (£35)
6. **King's Quest V** Sierra On-Line (£50)
7. **Laura Bow 2** Sierra On-Line (£45)
8. **Loom** US Gold (£46)
9. **Sherlock Holmes 3** Mindscape (£50)
10. **Monkey Island** US Gold (£46)

Edge charts

Each month Edge will be presenting its own brand of charts, either compiled by the magazine or by you – the reader.

Top five intro sequences

Some of the more impressive attract modes from Edge 1:

1. Microcosm – Without doubt one of the longest intros on any game ever.
2. Silpheed – So good, it should be shown at the local cinema. Battlestar Galactica in miniature.
3. Lands Of Lore – Glorious use of colours and great storyline.
4. Inca – CD-i's best game to date has a great intro, full of digitised pics and moody Peruvian music.
5. Jaggernath – Great robotic battle of the future, great animation, booming soundtrack.

Edge classic five

The following is a list of classic titles that have been emulated but never bettered. So, in no particular order...

1. R-Type – coin-op
2. Paradroid – C64
3. Street Fighter Turbo – Super Nintendo
4. Super Mario 3 – NES
5. The Sentinel – Amiga

What? You disagree? Well in that case, send in your own personal fave five to: Classics, Edge, 30 Monmouth Street, Bath, Avon BA1 2BW

Edge readers' most-wanted

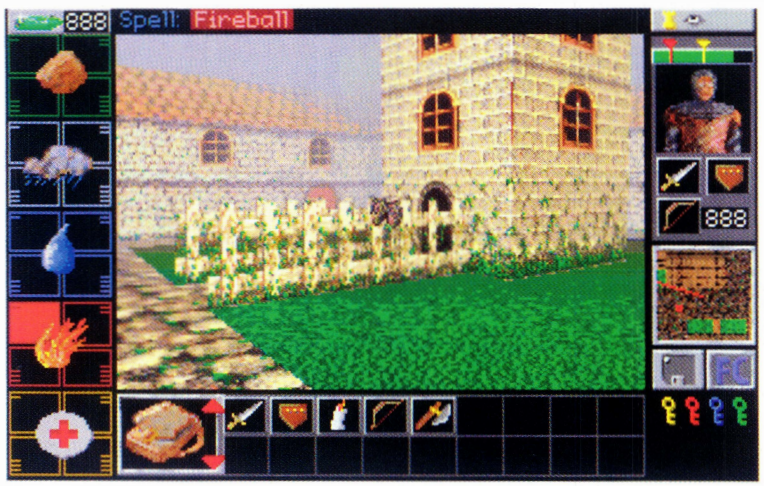
And this is where you come in: we want you to send in a list of the five games you're most looking forward to seeing, regardless of format. Send your list to: Incoming, Edge, 30 Monmouth Street, Bath, Avon, BA1 2BW.

By some margin the most technically ambitious game in E1, *Forgotten Castle* is set to revolutionise PC 3D, with incredible texture-mapped geometry and enemies featuring 120 frames of animation. Interplay's *Stonekeep*, meanwhile, has its own ambitions, not least with its use of digitised actors and firstperson swordplay.

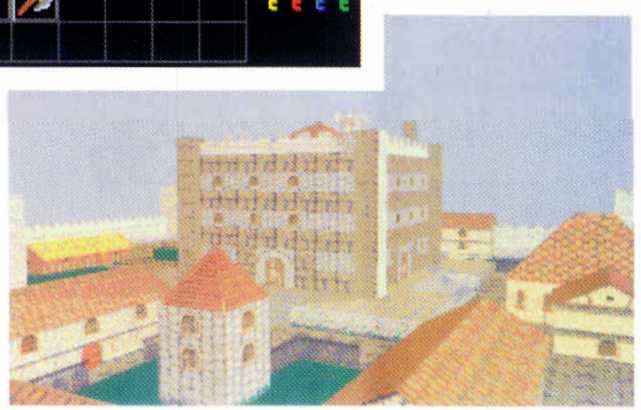
Forgotten Castle

Edge reckons Twin Dolphin's *Forgotten Castle* could take the RPG action adventure into a new realm. Join the quest

From the top: An utterly amazing stone wall that comes to life in front of you; a snail; an almost human-type thing; an insect; and lastly, some axe-wielding monsters. Each one has exactly 120 frames of animation



The depth-cued graphics are really outstanding. The interface with its weapons, keys etc, can be hidden



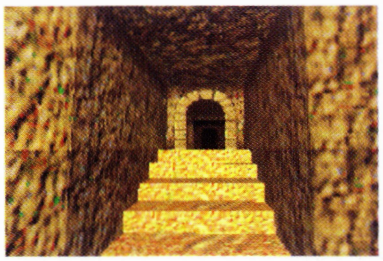
If you can imagine this detailed cityscape scaling and rotating smoothly around you, you're about one tenth of the way to grasping the graphic flair on display. Twin Dolphin are working wonders on the PC

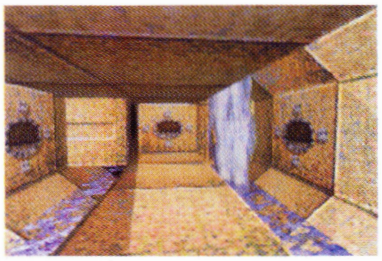
Format: **PC**
Publisher: **Electronic Arts**
Developer: **Twin Dolphin**
Release date: **10/93**
Size: **9 disks**
Origin: **US**

Now this really is impressive. It wowed the more discerning onlookers at the Chicago CES in June, and even made the best 3DO games look like Atari ST stuff. *Forgotten Castle* is a PC showcase of spectacular quality. The Ferrari of fantasy roleplaying games.

True, there's certainly no shortage of quality first-person perspective RPGs like *Dungeon Master*, *Eye Of The Beholder* and this month's *Lands Of Lore*, but the race is on to see who can produce the best-looking, and most user-friendly adventure yet.

And this game has already qualified on the first count. For its use of 256 colours, beautiful depth-cueing and, for the first time in this kind of game engine, its amazing 3D views. You can





There's a huge playing area to discover with an enormous range of environments (above). Check out the falling water that flows into the gutter (above right). It's lovely

The dungeons are equally well presented with detailed graphics and unrivalled angles of perspective. Skeletons wait for you in there, too

walk through the village and then turn and look in one of the windows for a realistic 3D interior. There's complete freedom of movement, unlike *The 7th Guest*. And the scaling graphics leave you breathless.

So what's it all about then? The story unfolds like this. You're a prince on an epic quest searching for your father, the last true king of the land of Alonia. Evil rules where justice once prevailed etc, etc, and you have to travel to the city of Hedburg to defeat the monsters and 'foul Ruzakian hordes' that have taken over the town.

There is a wealth of different environments including streets, caverns, crypts, and creepy dungeons. Everything takes place in real time, too, and there's an 'invisible' interface to help out, without bogging down the screen in icons. You click on the mouse and something dies, basically.

Okay, there's lots more to it than that but the feel of the whole thing is action-orientated. It's designed to appeal to a wide range of players, and as such, might not meet the grey matter-testing requirements of diehard *Dungeon Master* and *Ultima Underworld* fans.

It made the best 3DO games look like Atari ST stuff...

Stonekeep **has been created using a mixture of 3D rendering and bluescreen cinematic techniques. People had to dress up and strap bones to their bodies, before being filmed against bluescreen**

Stonekeep

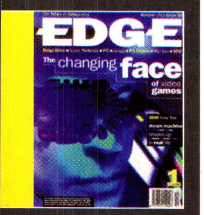
Stonekeep – is this going to be the best action RPG ever? **Edge** explores

Format: **PC**
Publisher: **Interplay**
Developer: **In-house**
Release date: **11/93**
Size: **9 disks**
Origin: **US**

And here's another great-looking dungeon game. 3D rendered graphics have been combined with digitised actors from bluescreen cinematography to create what looks like one of the best action RPGs yet. Check out the skeletons straight out of Jason And The Argonauts, and the action-based interface with your sword slashes as visible as the character in front of you.

Even the inventories and other interfaces are kept out of view until needed. As a PC-only product this obviously has the potential, like *Forgotten Castle*, to be very lavish visually. As usual though, it remains to be seen if the gameplay will be similarly well crafted.

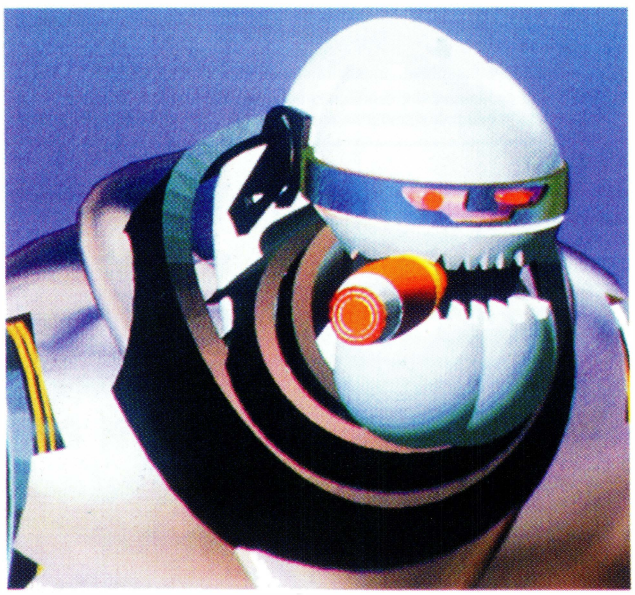
What about this dragon? A great example of what can be done in eyepopping 256 colours



Mirage does not have a reputation for producing world-beating software but with *Rise Of The Robots* it is keenly embracing the potential of 3D rendering software to create a cast of fighters that will distinguish the game from Capcom's *Street Fighter II* and its ilk. Perhaps we'll come back to this one...

Rise of The Robots

Rise of the Robots plays like an *SF II* clone, but looks very, very different. With graphics like these, who needs gameplay? **Edge** investigates



'Got a light mate?' Graphics from *Rise Of The Robots* are beautifully rendered. These are the 3D images being used in the PC and Amiga versions. Let's hope it all looks this good, eh?

Format: **PC (CD)/Amiga**
Publisher: **Mirage**
Developer: **Instinct Design**
Release date: **01/12/93**
Size: **1 CD/TBA**
Origin: **UK**

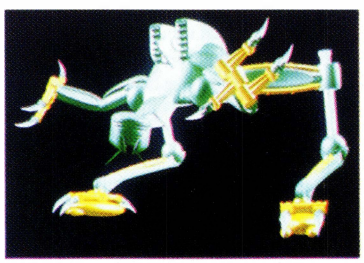
It was only a matter of time before game designers started using real 3D effects – like 3D morphing – as seen in films like Terminator 2. *Rise Of The Robots*, the first game from Mirage's new team of in-house developers, **Instinct Design**, does just that, and manages to look a bit special, too.

One-on-one beat 'em ups don't usually rely on 3D modelling software and high-quality ray-traced graphic images. In *Rise Of The Robots* each body part is modelled independently from blueprints, and then linked to let the robots animate convincingly. The animation is stunningly realistic and smooth on the PC version, with similarly impressive results promised from the Amiga version.

The game all evolves around Metropolis 4, a futuristic city, and the Electrocorp building where military and industrial robots are manufactured. All human staff have been replaced by a super-intelligent robot – the 'Supervisor' – programmed to manage the complex. But an ego virus infects the Supervisor, sending him haywire and power mad. So, the company sends in a Cyborg to sort him out. He faces five robot adversaries as well as the Supervisor, each one with its own artificial intelligence.

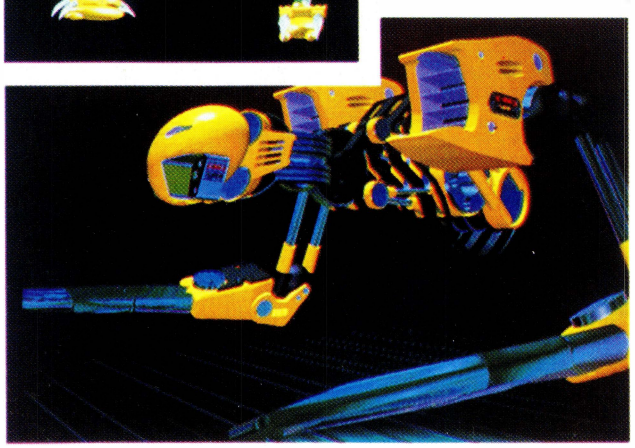
If ex-Bitmap Brother **Sean Griffiths**, who heads the Instinct Design team, can match these stunning visuals with varied and exciting gameplay, this could be an very interesting product. **E**

An ego virus infects the robot, sending him haywire and power mad



Some of the robots (left) look more like insects than anything else

Not only are the graphics well rendered (below), they're also superbly designed and implemented



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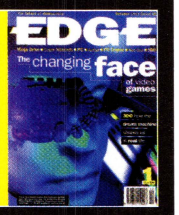


The claims made by 3DO for its upcoming game console are proving hard to swallow, so it's time to take a peek behind the curtain to find out the truth about Trip Hawkins' super-hyped 32bit powerhouse. Some pieces of the puzzle don't seem to fit – and not only game names like *Grease And Gunge* or the $700 price tag...

You've heard about it. You've seen the pictures... But don't believe all you've read about 3DO. **Edge** looks beyond the hype and asks: is 3DO really the ultimate CD games machine, or is it just vapourware?

The **real** deal?

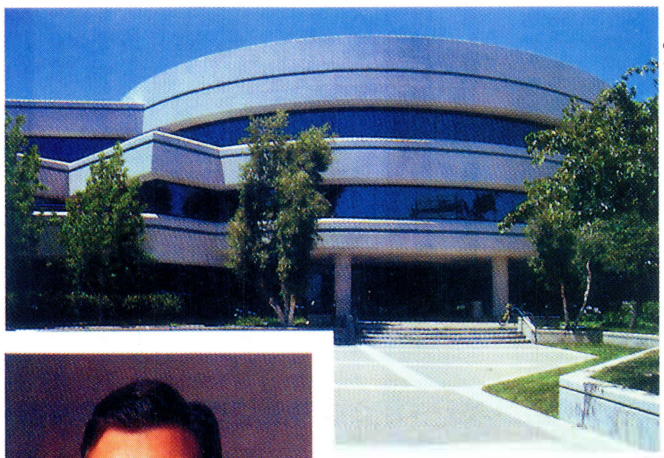
'There's never been a rise in performance of 50 times like this'

Trip Hawkins, boss of the 3DO Company

'I pressed the Disc Eject button. There wasn't even a disc in the player tray'

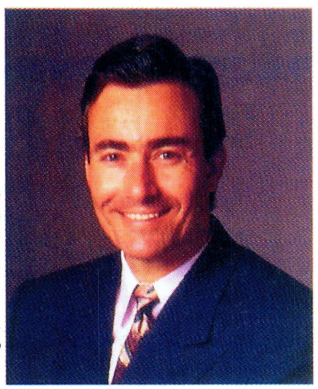
Barry Fox, journalist

3DO



Photograph: **Jez Black**

Real estate: 3DO's HQ, San Mateo, California, used to belong to EA



Photograph: **The 3DO Company**

Trip Hawkins, 3DO Company boss... can his machine match his dream?

What exactly is 3DO? Firstly it's a Digital Interactive Multiplayer – a powerful CD-based home entertainment system that will cost about $700.

The 3DO, being made by **Panasonic**, is scheduled to hit the States in October.

But 3DO's more than that. It's also the name of the Californian company behind the machine. The 3DO Company is the child of **Trip Hawkins**, ex-president and chief executive of **Electronic Arts**. The company has yet to ship a single product, yet its first share offer valued it at $300 million.

3DO's raison d'être is its potential to become a standard. Remember how VHS beat Betamax and Video 2000 in the race towards a standard for home video? Well, 3DO wants to be the VHS of interactive entertainment, and it has secured the crucial backing of EA, **AT&T**, **Time Warner**, **Matsushita** and **MCA**. →

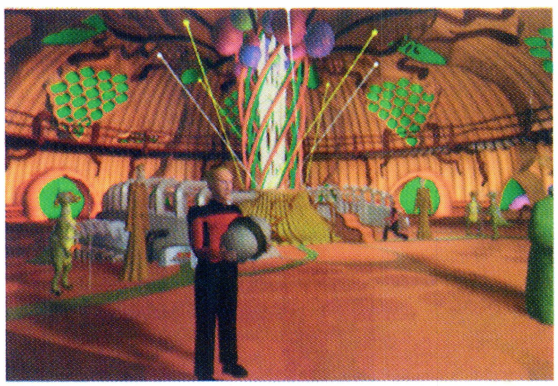
At the Chicago Consumer Electronics Show in June, **Trip Hawkins**, The 3DO Company's charismatic leader, sold 3DO to the games industry. And he sold it just as hard and impressively as people had expected him to.

Heads did indeed nod, jaws duly dropped and software companies positively purred over the multitude of development opportunities. And while most agreed that this looked like the future of interactive entertainment, some suspected they were being taken for a ride. And not just on the 3DO publicity bus. Hardware wasn't finalised and yet systems were shown running games, and some of 3DO's technical claims seemed to go just a little too far. Was industry golden boy Hawkins trying to pull the wool over people's eyes?

While 3DO stole a hefty chunk of **Sega** and **Nintendo**'s glory at CES, it's no secret that the majority of 3DO software running at the CES was actually being generated by Apple Mac Quadras (the same workhorse used to design **Edge**, no less). Ah, but 3DO wanted it to remain a secret, all the same.

After all, you don't wimp out just because your demo units aren't finished in time for the show. You fake it. Or simulate it.

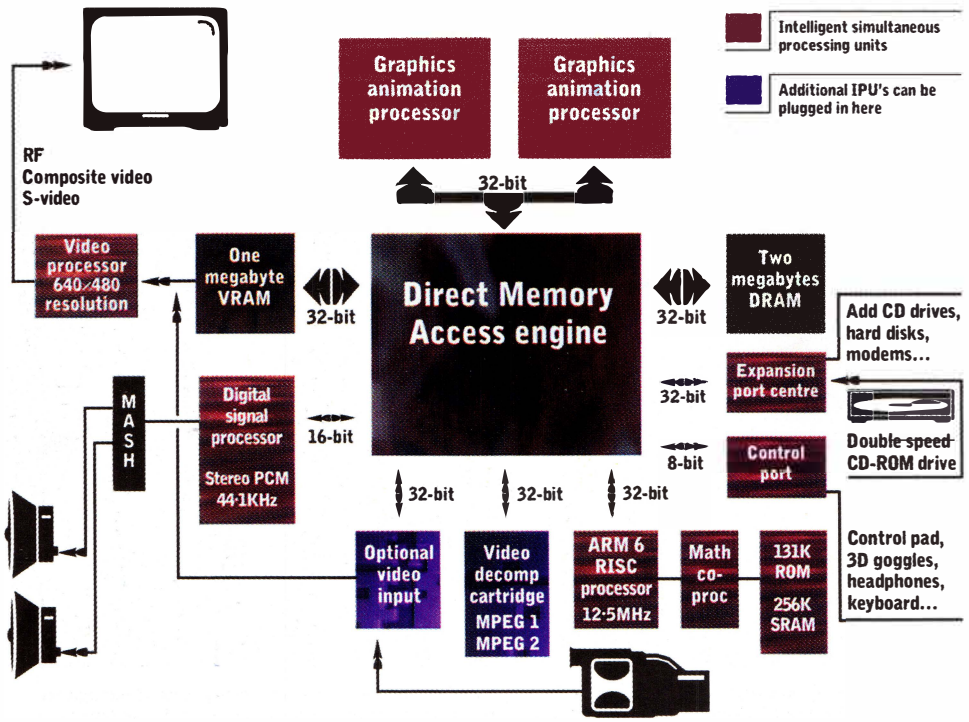
Think about the irony. Fast, exciting 3DO games on display everywhere, and not a single fully-working 3DO unit in sight.



Spectrum Holobyte boldly goes onto 3DO with *Star Trek: The Next Generation*

Continued next page

techview: multimedia



3DO's architecture is a mixture of 32-bit RISC processing supported by a Direct Memory Access engine for high-speed data movement, and a pair of custom animation engines that work independently of the CPU. These produce high-resolution images that can be warped and then lit from any direction. Impressed?

The boldest claim

3DO have made, is that their hardware is '50 times faster than conventional 16-bit systems'. And the strangest thing is, no-one seems to be questioning it; just believing it, and telling others they'd better believe it too. But with 3DO skirting around the edges of technical details, a more detailed analysis is the only way to put things in perspective. So just how powerful is 3DO?

32-bit RISC processor

The RISC (Reduced Instruction Set Computer) Central Processing Unit used in the 3DO is called the ARM6 and has also been used in the Acorn Archimedes home computer. While the clock speed doesn't sound much at 12·5MHz, it's a true 32-bit chip and it will execute most instructions in one, sometimes two cycles. For a speed comparison, the ARM6 in the 3DO is roughly equivalent to an Intel 486 running at 33MHz. Pretty damn fast. There are some differences. For a start, a 486's speed is hindered by things the 3DO just won't have to think about. Things like a RAM cache, segment architecture, and having to run Intel's 8088-compatibility code – all these have to be factored into speed. 3DO's RISC architecture allows it to streamline a lot of the things a 486 or any other Industry Standard Architecture (ISA)-based processor is burdened with.

And what's more, 3DO's got some nifty graphics hardware in the form of the twin cell engines. Now these *are* fast – faster even than the 3DO's RISC processor.

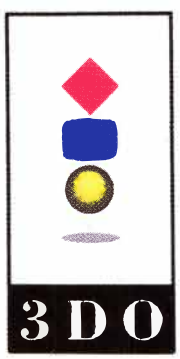
As for that elusive '50 times faster' factor, the 12·5MHz clock speed of 3DO copes with about six million instructions per second – making it in raw numbers about six times faster than the SNES and Mega Drive CPU. Not 50 times faster.

Animation processors

The key to the system's high-performance architecture is a specialised pair of animation engines, that can, it's claimed, display or move up to 64 million pixels per second. That's compared to the mere one million pixels per second average of 16-bit systems, and the three million pixels per second average of 32-bit systems. These engines organise the graphics into 'animation cells' similar to the graphics engine in the Atari Lynx.

3DO's animation cells are high resolution, full colour images, that can be moved, scaled, rotated, warped, texture-mapped, lightsourced

Continued

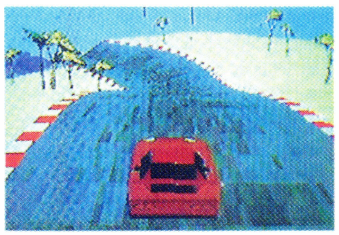


In fact, the only units that did manage to run something during the show were 'single-task' machines running things like CinePak video demos.

And it wasn't just 3DO who were cheating. Journalist **Barry Fox** describes the Panasonic stand at CES, 'A Panasonic player was running a car race game and the demonstrator told me it was a 'working' player. I pressed the Disc Eject button. There wasn't even a disc in the player tray. The wires from the joypads looked as if they went into the backs of the players. In fact, they went through holes in a partition just behind the backs of the players. From there they ran to Apple Quadras.'

After the CES Trip Hawkins insisted that 'things were unfinished,' and when quizzed about the computers, he admitted that the demonstrations at Chicago had relied on Quadra development systems and on players capable of performing only single tasks. But he also stressed that the players shown at the CES did not contain the 'final chipset'. But Panasonic in the US claimed the players were 'final prototypes' and 'complete', and only the program software had come from the hidden Quadras.

The 3DO hardware was far from being finalised even by the time the Chicago CES took place back in June. And rather than showing towering stacks of computer hardware 'supporting' their unfinished little black boxes – and thus potentially undermining all their surefire claims about the 3DO system meeting its launch – things got a little bit sneaky and underhand. Besides, very few



One of the many 3D texture-mapped games being demonstrated at the CES – *Grease And Grunge*

and even made transparent with the aid of 3DO's Cinematic Software Tools. These cell engines draw the images while the RISC CPU calculates where the images are going. For pure polygon generation as seen in games like *Starfox*, and texture-mapped 3D as seen in things like *Forgotten Castle*, 3DO is exceptionally fast.

DMA Engine

One of 3DO's strongest features is its DMA engine. Direct Memory Access enables the system to shift around huge chunks of data within its three megabytes of memory without using the CPU. And 3DO can do it faster than 16-bit technology.

If you're doing 'normal' DMA, 3DO can move about six megabytes a second, compared to 2·6 megabytes a second on 16-bit, such as the SNES – two-three times faster. However, 3DO has something called 'Sport DMA' which moves longwards in a cycle. This means that instead of the DMA moving data at 12·5 megabytes a second, it moves at four times that – 50 megabytes a second.

In fact, this is the only equation with a 50 in it, and it still isn't 50 times faster than the DMA speeds of 16-bit technology, just 20 times.

Video display

Now, this is really misleading. On paper, 3DO claims that the system is capable of a resolution of 640×480 pixels. This just isn't true. 3DO only has a 320×240 video memory, not 640×480, but it is capable of *looking* like 640×480. The hardware cheats by comparing adjacent pixels and producing a new, intermediate pixel (horizontally *and* vertically) by averaging the two colours. If you have a black and white pixel next to one another, the new pixel would be grey.

By anti-aliasing the pixels in this way, you end up with a smoother gradation between pixels, but it's certainly not a true high-resolution screen.

And, like the Amiga in interlace mode, the screen constantly flickers. This is negligible during play when there are loads of graphics moving about, but on text screens the effect is less than pleasant. Sadly, there's nothing you can do about it.

Finally, the 3DO system also has the ability to take two separate pictures and fully interleave them to give stereo imaging for 3D glasses.

So finally, the system is powerful – faster than a 486 PC and way ahead of current 16 or 32-bit technology. But without defining the benchmarks (things like processor speed or polygon generation), comparisons like '50 times faster' are worse than pointless: they are misleading. 3DO doesn't need this kind of number juggling and tricksy marketing. The truth is quite impressive enough. →

Photograph: The 3DO Company

'I don't think it's too early' says Trip Hawkins, CEO of The 3DO Company. 'The technology is good enough to take a sufficient leap forward at a reasonable price. I know it's going to work.' For his sake, it had better...

people bothered to ask any awkward questions.

3DO is still scheduled for an October release but there are doubts about the company's chances of achieving it. In the words of one 3DO developer, 'If The 3DO Company make their October deadline it will be a miracle, honestly. For it to ship in September, Panasonic should be manufacturing 3DOs now [and this was July]. You can't manufacture something that ain't finished.'

And with the RAM being boosted from two to three megabytes in late July, the system was hardly what you'd call finished. Of course, 3DO remain resolute in their promise of the system's onsale date, 'We're throwing all the final switches and there will be machines in the market place in October', claims 3DO senior vice president of software, **Bill Duvall**. 'It doesn't take three months to do the manufacturing and I think some of the concern has been about whether the chipset will be ready in time. The boxes will be on a boat shipping over in September.'

Whether the system makes the deadline or not, a common view is held that the company has been far too ambitious within the machine's tight development cycle. Some say they should have scaled things down a bit or given their hardware people another three to six months to really iron out the technical problems.

Still, at least the guys at 3DO are trying to help developers with

***Mega Race* is a smart rendered 3D game from top French developers Cryo (*Dune I & II*)**

Continued next page

Electronic Arts

Photograph: Jez Black

Close to the 3DO building in sickeningly sunny San Mateo you'll find EA's impressive HQ

Photograph: Electronic Arts

Stewart Bonn, in charge of CD-ROM development at EA

As one of the most committed partners in 3DO, **Electronic Arts** is taking 3DO very seriously. And with EA's founder and ex-chief executive **Trip Hawkins** manning 3DO's helm, EA is counting on big changes in the world of home entertainment. **Edge** spoke to **Stewart Bonn**, the man behind EA's CD-ROM development.

Edge Why did EA get involved with 3DO?
Stewart Bonn 'Trip Hawkins and some other EA people decided to sponsor a research and development project to come up with a new product, and in particular, a potential hardware standard. We met the **New Technologies Group**, who were also keen for a new hardware standard, and it took off from there.'
Edge So how do you think 3DO compares to other CD systems?
SB 'The jury is still out on whether a CD drive attached to some of these other systems is really comparable to playing from RAM and hard drives, or in the case of consoles, from a cartridge. But I certainly haven't seen anything on the Mega CD that says 'Buy me'.

'3DO addresses a lot of the typical CD access problems by including a double-speed CD drive, and we're counting on the architecture of 3DO's hardware to make the most of the storage ability of CD-ROM.'
Edge So what's EA's approach to the 3DO hardware?
SB '3DO's so damn fast that there are a bunch of things that you can do to create motion and interesting things on the screen to offset the need to stream video off the CD. I think we're going to have the sort of gameplay that videogame players really like, and not the sluggish stop-start gameplay that CD seems to give on other systems. We're reinventing technology in many ways.

'The stuff we're doing on 3DO has seen a complete demolition of all previous techniques. For example, we've had to completely rethink the way football and other sports work onscreen – and the way rendering happens in games like *Shock Wave* is completely unique.'
Edge But 3DO still hasn't got high-quality full-motion video as standard. Surely there are problems only having MPEG technology as an option?

***Road Rash* on 3DO. A far cry from the relatively barren Mega Drive version**

SB 'I think MPEG in itself is a problem, as it offers something that no one really needs in the games market. It's good kit but it does nothing for gameplay.'
Edge But 3DO does have CinePak. Will you be using that to create movie-style effects?
SB 'Yes, we will be using CinePak, but sparingly. For example, in *John Madden Football* on 3DO you'll see a lot of video, but it's only in bits of digitised commentary used for effect. We're not that impressed with CinePak, so, wherever we can, we'll be photo-composing scenes, instead of using video streamed off the CD.

'Using photorealistic images on both backgrounds and foregrounds, and animating them separately with the hardware, we get a far superior effect to just running the whole thing through CinePak.'
Edge Will your commitment to 3DO be affecting your support for other systems?
SB 'No. That's part of the reason why all our 3DO stuff is achieved with additional one of the best technical support groups going.

On a different level, it looks like **Matsushita** could experience a few problems with its manufacturing supply of the 3DO units. Apparently a large Taiwanese

'A lot of people were impressed by what they saw at CES but they're forgetting about gameplay. I haven't seen a single game yet that says, this is why I must have a 3DO'

Bill Heineman, 3DO programmer, Interplay

Some of the intro screens in *Road Rash* are digitised in 24-bit colour for excellent results

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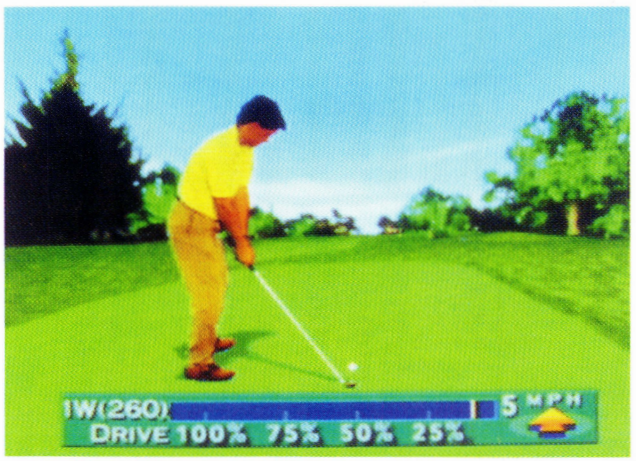
***Shock Wave* from EA. This mission-based space flight sim features some striking photorealistic images**

Park Place Productions' excellent *John Madden Football* has been transferred onto 3DO by EA



One of EA's biggest-selling titles to be transferred from existing platforms is *PGA Tour Golf*. This one's likely to be a big seller on 3DO – even if it does look surprisingly like Philips' tedious golf game on CD-i

people, and not just our best people from other platforms.'

The biggest

software publisher in the world isn't taking many risks with 3DO – half of their planned 3DO titles are already established on other formats. *PGA Tour Golf*, *Road Rash* and *John Madden Football* have all graced machines like the Mega Drive, PC, and Amiga, and their arrival on the 3DO will be used mainly as an instrument of comparison for weighing up the new technology against the old.

The 3DO version of *Road Rash* uses hi-res 24-bit art to set the scene for the game, and has preliminary graphics that look nice enough, if a little lacking in colour and detail. Huge buildings scroll past in a similar fashion to a Sega coin-op (though not nearly as smoothly), but some evidence of 3DO's power is certainly there.

What wasn't there in the version **Edge** looked at was decent sprite manipulation – the cars and bikes jerked around the screen rather unconvincingly.

The only other 3DO game **Edge** played at EA was *Shock Wave*, a 3D space shoot 'em up. It's entirely new, and uses photorealistic graphics and an excellent 3D texture-mapped terrain. Unfortunately, the price paid for such realistic graphics is high – you get a sloppy frame rate – and the only impressive bit in the game is the excellent Return Of The Jedi-style walkers that stomp around the screen.

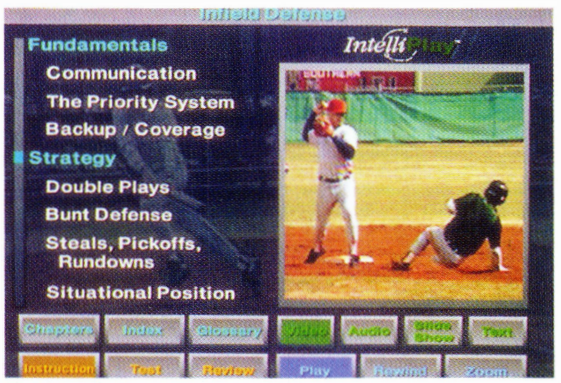
This one's not expected to appear until February at the earliest, so it looks like EA will be hedging its bets with one of its popular sports titles when the 3DO system actually appears in October. →

company that produces the glue used in a good chunk of the world's supply of RAM chips, burnt down recently, drastically cutting the supplyline of RAM chips to many large computer companies.

Despite Matsushita's status as the world's hugest consumer electronics company, people are suggesting the price of RAM might soar dramatically, possibly even affecting the retail price of Panasonic's machine, now budgeted for an extra megabyte of memory. Watch this space.

Dodging all of the development and manufacturing hiccups, suppose – just suppose 3DO does make October after all. Who are the first consumers to subscribe to this vision going to be? At $700, there's hardly going to be a stampede, and Trip Hawkins knows it. He sees the first 500,000 buyers as the early innovators, or pioneers of technological oneupmanship.

'Whenever you get a big jump in performance', says **Hawkins**, 'half a million people will buy it no matter what you do in terms of marketing and support. Look at the Atari ST,' he says, 'Atari did everything wrong and they still sold half a million. Look at the Commodore 64. It was seen at the time as a games machine. In 1993 dollars it cost well over $1,000 – and they *still* sold 15 million of them worldwide.'



Intellimedia's line-up of 'interactive' sports games use full-motion video. Wow, etc

It's not encouraging, then, that early innovators were tempted into backing such unsuccessful concepts as Sony's excellent Betamax video standard (still the technology VCR

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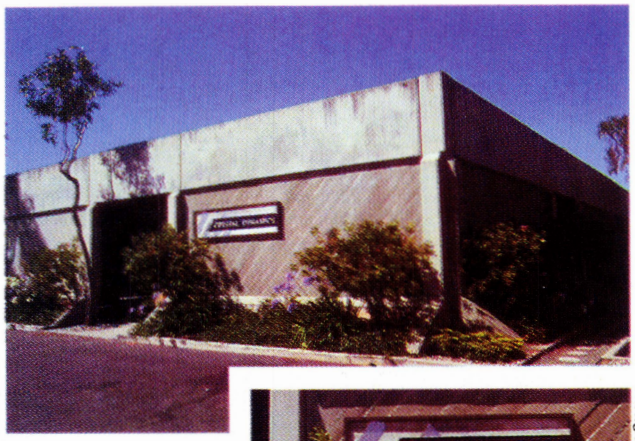
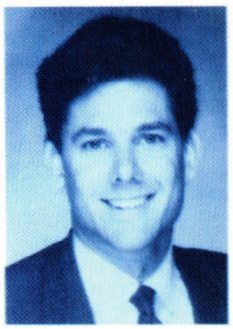
EDGE magazine October 1993

Crystal Dynamics



Photograph: Jez Black



Photograph: Crystal Dynamics

Photograph: Jez Black

Crystal Dynamics' HQ in Palo Alto, California (top) is now home to CEO Strauss Zelnick (bottom left), ex-president of Twentieth Century Fox. Pictured bottom right is Crystal Dynamic's Scott Steinburg (centre) with 3DO programmers Mark Cerny (left) and Eric Knopp (right)

No established games companies are bold enough to concentrate their efforts entirely on 3DO – but **Crystal Dynamics** – a Silicon valley start-up software company – is doing just that.

Considering Crystal Dynamics is so small and has yet to launch a single game, they're generating lots of interest. And it chiefly surrounds their new president, **Strauss Zelnick**, who now heads their team of 30 in-house 3DO game designers and programmers.

35 year-old Zelnick is the ex-president and chief of operations at **Twentieth Century Fox**'s film unit: he leaves behind him 1,200 employees and a division with annual revenue close to $2 billion. His previous salary was reputed to be $1 million a year.

For a fledgling company like Crystal Dynamics, this is a move of major significance, and it shows outsiders how seriously Hollywood is taking the $5 billion US games industry.

Quizzed about his move by the Wall Street Journal, Zelnick replied: 'I don't want to sound like I'm some trendsetter, but I know there will be others. There's just too much opportunity out there.'

Zelnick believes that the cutting edge of entertainment lies with new technologies like 3DO. And he's prepared to put his career on the line to prove it. As a further testament to this longterm commitment, Crystal Dynamics will be developing only for 3DO until other suitable (ie 32 or 64-bit) platforms appear.

But Zelnick also knows about the other side of the 'interactive entertainment' coin. His involvement with the interactive multimedia arm of Twentieth Century Fox left him cynical about the more grandiose Hollywood plans for interactive media. 'Storytelling isn't by nature interactive,' he says. 'It needs a teller and a listener, and the teller doesn't ask people, 'do you want the princess to die or not?''

Zelnick agrees that there's still much to be achieved with interactive games. The creative side of the games market is still 'at the stage of the Keystone Cops', he believes. Videogames need a 'vernacular', he argues, 'something that movies have had since the 1930s'.

But what does the future hold for one of Hollywood's youngest big-timers? Zelnick, ever confident, leaves the games industry with a challenge: 'We are looking for people to participate in what we believe will be a $20 billion entertainment business – it's going to be as big as the whole movie business worldwide.'

But how is such a small new company capable of making such a loud noise? And, more importantly, why is the industry taking notice?

Perhaps it has something to do with the company's chairman, **Dave Morse**,

'What we're doing is damn near as good for a whole lot less money. They'll launch at about $700. I'm not interested in machines over $500'

Tom Kalinske, President, Sega USA

should have adopted), and Laserdisc, which despite a recent revival, was always too expensive to be a mainstream alternative.

And naturally, its competitors are quick to suggest that the 3DO system is firmly planted in the same premium soil. Especially at $700.

One of EA's edutainment titles is *World Builders*, a spectacular product from 3DO's inhouse team

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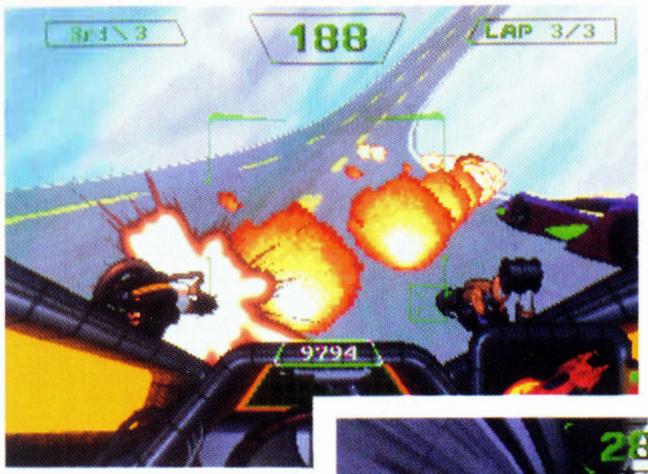
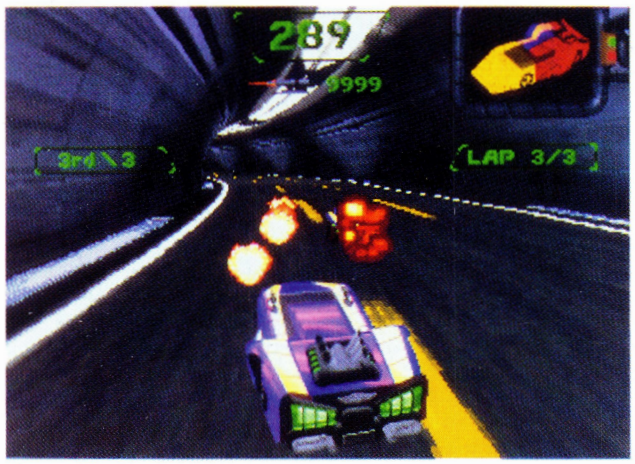


Some of *Crash 'n' Burn*'s tracks are transparent and dip, twist and turn like a roller coaster. The sky moves in 3D too

When finished, *Crash 'n' Burn* will include multiple weapon systems and a racing circuit where cars can be upgraded



***Crash 'n' Burn*, Crystal Dynamic's first 3DO game, is an excellent showpiece for the new hardware. The scenery and scaling effects are impressive, if a tad jerky. Still, you can't have everything**

ex-president of the **New Technologies Group** – the company that engineered 3DO hardware alongside **Electronic Arts**. Or the fact that they've also managed to recruit some top industry talent for both game design and marketing.

Realistically, it's probably got just as much to do with the fact that they out-performed other 3DO developers at the Summer CES by demonstrating the two best-looking 3DO games yet seen – *Crash 'n' Burn* and *Total Eclipse*.

Crystal Dynamics' **Scott Steinburg** explains, 'We're taking a Hollywood approach in our products and trying to incorporate lots of basic cinematography skills into our gameplay. The last thing we want to do is create games that are just a lot of window dressing – like *Night Trap* on the Sega CD.'

Window dressing or not, the company's first titles will be major catalysts for shifting 3DO systems. *Crash 'n' Burn*, a sort of kill-or-be-killed version of *Virtua Racing* with guns, missiles and explosions, will be Crystal's first game and will appear at the same time as the Panasonic 3DO unit itself.

It's basically a Mad Max-style racing game packed with impressive texture-mapped visuals, and with a choice of two perspectives – in and outside the car. There's none of that incredible *Virtua Racing*-style eye-in-the-sky stuff, but even 3DO has its limits.

Crash 'n' Burn is still a very impressive attempt at a fast action game, and includes a selection of exciting and diverse tracks. It also promises loads of new features to come.

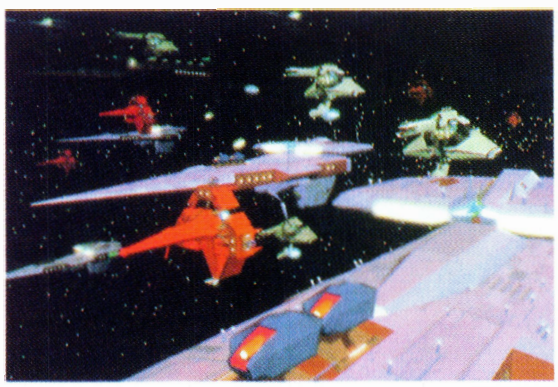
Total Eclipse is different. It's a space combat simulator and is even more impressive than *Crash 'n' Burn*. If you can →

'If Hawkins gets all 500,000 early innovators as he hopes to', says Nintendo's **Bill White**, 'that gives a market $^{1}/_{10}$th to $^{1}/_{20}$th the size of either Sega or Nintendo's installed base.'

Ah, but if 3DO's $500 target price materialises, and 3DO are saying it will when other manufacturers such as **Sanyo** and **AT&T** enter the market, then Bill will have to do some more sums. Oh, and he just might have to budge over a bit, too.

In total over 300 software companies, including talented development houses such as **Origin**, **Argonaut** and **Bullfrog**, have signed up to develop games for 3DO. And that's before a single 3DO machine has even been unboxed. So what lured them? Why was this one party they just couldn't afford to miss?

Well, the reasons are twofold. First, it is virtually free. Only a few hundred dollars, in fact, is all that it takes to become a 3DO developer. With such a small entrance fee, there's inevitably a lot of window shopping going on. Few companies are committing themselves straight away, and most will wait and see if the system really takes off before ploughing funds into game development. But the browsing isn't taking very long in some cases.



'Many companies adopted a waitsee approach nine months to a year ago. One of the things we've noticed since then is that most didn't wait very long,' claims 3DO's

Namco Co Ltd, producer of 3D games like *Galaxian*^{3} (above), have signed for 3DO

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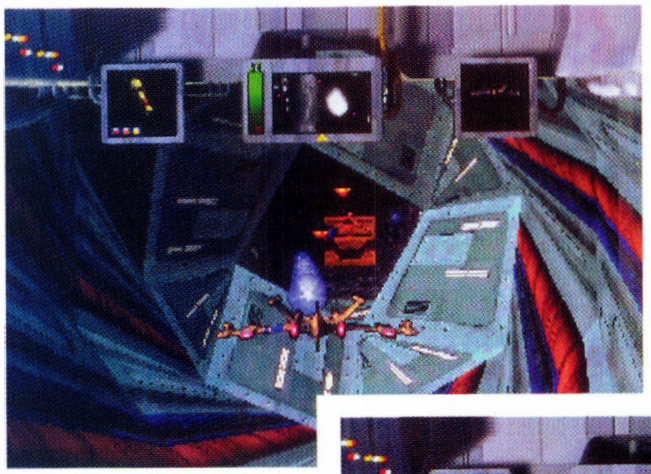
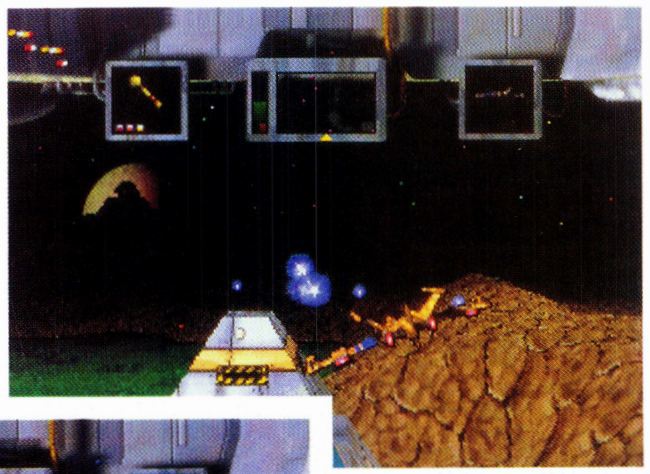
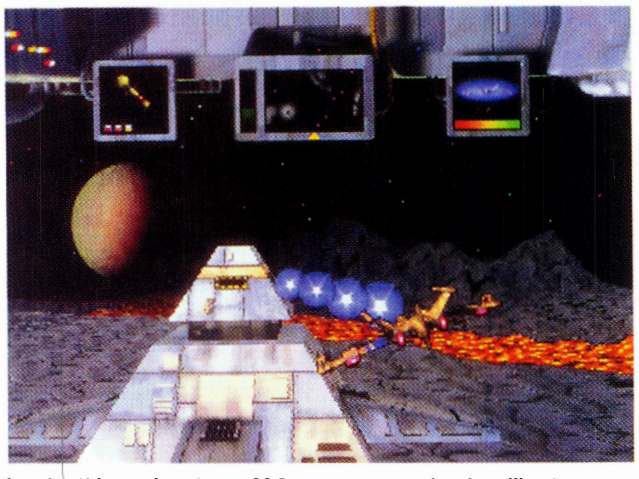
techview: multimedia



Total Eclipse's world rotates effortlessly around your ship. And it's so, so smooth



Both of Crystal's titles have a behind-the-ship viewpoint as well as an in-the-seat perspective



Imagine this running at over 20 frames per second and you'll get a good idea of how smooth and fast it really is. That lava flows, too

← imagine a version of Sega's *Galaxy Force II* with more freedom of movement and far more imaginative landscapes, then you'd be getting close. Again, there's a choice of viewpoints, this time similar to those in *Starfox*, and there are 20 different levels.

The main difference with *Total Eclipse* is the strangely sculptured terrain that looks very unusual and yet moves surprisingly smoothly.

It can even be rotated through 360° for a particularly stomach-churning effect. And all the 3D graphics have been speeded right up since they were first seen at the CES.

In fact, the texture-mapped graphics and 3D scaling in both games consistently shone brighter than the gameplay, which is something that seems to be keeping a very low profile at Crystal Dynamics.

Even in July, most of the programming at Crystal Dynamics was still concentrating on the way it all moves onscreen.

And given the tight deadlines they're working to, you can't help wondering just how much gameplay is going to make it into the finished games.

Programmers

for Crystal Dynamics Mark Cerny and Bill Willis both worked at Sega's Technical Institute in the United States, where they programmed *Sonic 2* on the Mega Drive alongside the original Japanese creator from Sega of Japan.

Mark even designed and programmed the brilliant *Marble Madness* coinop donkey's years ago for Atari.

Continued

'I bet $10,000 that we generate more income from just one game – *Super Mario All Stars* – than 3DO get from all hardware and software sales this Christmas'

Peter Main, Vice President, Nintendo USA

Bill Duvall, 'certainly not once they'd seen the technology demos and some of the software in development.'

The second reason for 3DO's support is its approach to software regulation. There isn't any. Apart

Bullfrog have three 3DO games in the pipeline. *Theme Park* allows you to create your own Alton Towers

Photograph: Jez Black

Above: Irvine, California is the home of Interplay Productions. Their offices are just a stone's throw from Virgin Games USA.

Photograph: Jez Black

Right: Game Designer Bill Heineman demonstrating *Out Of This World* on 3DO

Interplay

Interplay's first games on 3DO are going to be *Out Of This World* and *Battle Chess*. Interplay Programmer **Bill Heineman** told **Edge** about the system, and the changes he made to get *Out Of This World* onto 3DO.

Bill Heineman '*Out Of This World* will be out the same time as the 3DO system in October, so there wasn't time to change the gameplay. But it got a major facelift with the inclusion of new 32,000 colour backdrops.

'They were redrawn by a Hollywood company that specialises in creating background graphics for cartoons. They've added about 70 megabytes of graphics, and each backdrop is loaded from the CD as soon as you reach the edge of the screen. It's fast – it only takes half a second – but that delay still might mean putting some kind of compression on the images.

'The game window doesn't exist anymore either, so we've got a full screen display running at 60 frames a second the whole time. In fact, the machine's so damn fast at generating onscreen polygons that I have to use a speed governor to keep things in check. Without it, Lester would run across the whole screen in slightly less than a quarter of a second! Oh, and there'll be some proper music in the 3DO game, too.'

Edge But, apart from the speed, is the 3DO hardware everything it's cracked up to be?

BH 'Well, the cell engine is actually a derivative of what they did on the Atari Lynx. They've got a piece of hardware that can stretch, bend, rotate and draw an image and you don't have to write code for the machine to do this. But that's all it can do. It still requires everything to be drawn.

'For example, the Super Nintendo has Mode 7 where a background image can be rotated and scaled in hardware. All the developer has to do is write to about six or seven registers and instantly the video is altered. On 3DO I have to tell the machine how to draw an image, and then it physically has to draw it.

***Battle Chess* is being written on 3DO with the help of UK developers Krysalis**

'The machine is fast enough (almost) to handle just about every effect of SNES Mode 7, but you could still do it all a lot faster on the SNES.

Interplay have some fairly grandiose plans for 3DO games. *Stonekeep* perhaps?

'But then again, you'll see styles of game on 3DO that will blow away everything you've ever seen on other systems.'

Edge But do you think 3DO will really succeed?

BH 'The product they ship to the stores will almost certainly have flaws – possibly in the hardware, but mostly in software. I mean, →

from the necessary bit of quality assurance – making sure software works – 3DO will let publishers decide what gameplayers should and shouldn't see. And the number of games released, too.

This kind of approach has been well-received, naturally, especially in light of Nintendo's and Sega's restrictive practices. By creating an unprecedented 'level playing field' for publishers to enter the market, 3DO's plan falls neatly into place, with only software pricing remaining a tentative issue.

Trip Hawkins is determined to convince people that cheap software is more than just a possibility. 'That's the difference between a medium, which this is, and a business like videogames. In videogames, software is expensive, there are no returns, and the publisher is risk-averse. A medium is like the newspaper business; like television or magazines. The cost of manufacturing each individual unit of software is extremely low. So the end price to the consumer is trivial.'

But if anyone's expecting these kind of low, low prices at launch, they'd better wise up. The only way software companies will be able to sell titles for less than $30 or so, is if the 3DO system becomes a big worldwide standard, and 3DO games start selling millions of copies, instead of just thousands.

Magic Carpet* from Bullfrog – a sort of *Prince Of Persia* meets *Space Harrier

So for the first few hundred miles of this journey, at least, development costs will be very high, returns will be low, and games are unlikely to come in at

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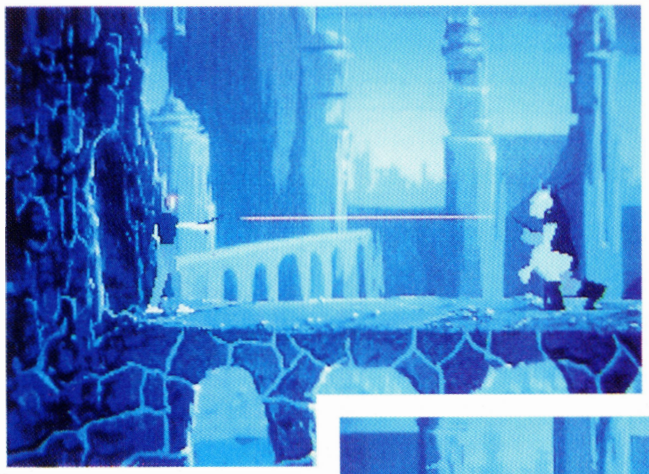
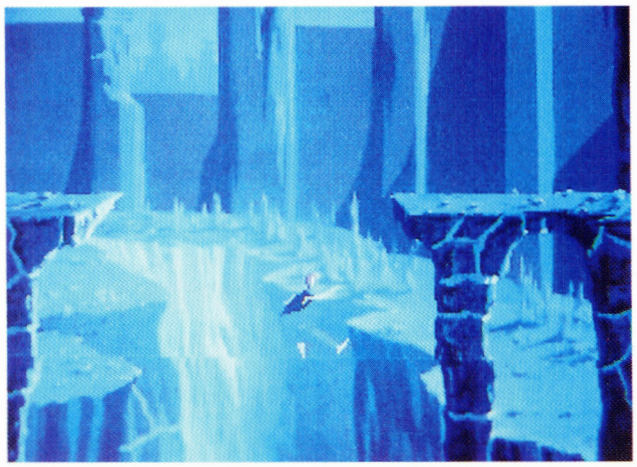


In 3DO *Out Of This World*, foreground soldiers scroll past with no loss of speed

The speed of the animation in *OOTW* is faster than on the SNES



***Out Of This World* on 3DO looks gorgeous and promises to sound even better. Those 32,000 colours really make a huge difference**

← I've found hardware problems that *they* didn't even know about, which means there's a slim chance that they won't be fixed even in the final version of the 3DO hardware.

'The main thing 3DO has going for it is the number of developers that they've managed to get signed up. This just about guarantees success.

'But I can tell you right now, out of that long list, only about 20 companies are currently developing software. The rest are waiting to see what happens. If it doesn't take off, these companies only lose the licence fee: a few hundred dollars.

'Besides, if 3DO make their October deadline it will be a miracle. For the system to ship in September, they should be manufacturing 3DOs now, and you can't manufacture something that simply isn't finished.

'The guys at 3DO are trying hard to give developers what they want, but what they're doing is a little too ambitious in my opinion. They should have scaled things down to get the system out this soon.'

Edge If it ships in October, should people pay $700 for it?

BH 'Ask me that question next year. When it first ships, 3DO will be lucky to have anything more than three or four games that are ready for any kind of serious gamesplayer.

'A lot of people were impressed by what they saw at the CES, but they are forgetting about gameplay. And I haven't seen a single game yet that says, this is why I have a 3DO.'

With these

two games, Interplay are testing the water before committing themselves fully to 3DO. Whether their impressive roleplaying game *Stonekeep* will appear hasn't been confirmed, but if the PC version is anything to go by, it should be a likely candidate.

Continued

much less than we're used to.

But you've got to hand it to 3DO. Besides the impressive product and the unrivalled software support, they've so many heavy-weight believers in this pre-cooked bundle of promises that it's hard to see how it can fail.

3DO's in-house development team are currently transferring *Jurassic Park* to 3DO for MCA

Gamesplayers want the jump in performance, the industry needs a standard, and software companies need a mainstream platform that isn't restrictive to publish for. But there are two things that may yet spoil the party.

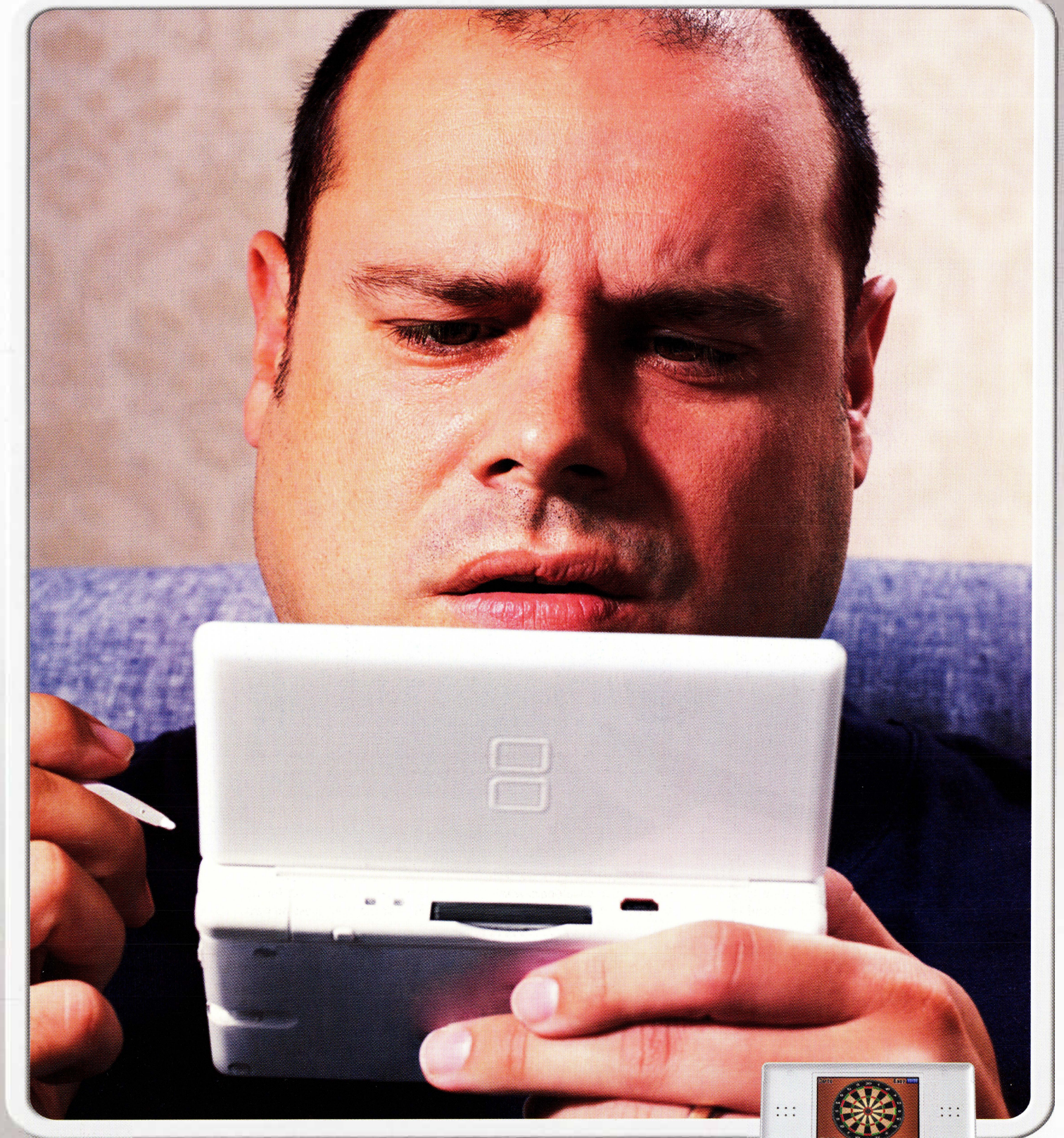
● **Expectations** Remember when the Amiga replaced the Commodore 64 back in the late eighties? The tenfold jump in performance, though major by existing standards, wasn't enough to handle the colour graphics at the same speed as on the C64. And much of the software was a letdown because programmers were taking on too much.

3DO's hugely powerful and you'll see some stunning games for sure, but unless programmers scale their ideas down, gamesplayers are going to be bitterly disappointed by the trade-off in speed...

● **Interaction** ... And they're going to be even more disappointed by the lack of interactivity. 3DO may offer enhanced graphics and more realistic playing environments, but game design could be dire. Interactive movies are tedious; gameplay sucks. 3DO designers and programmers must look to involve people, not merely entertain them.

Can Trip turn his 3DO dream into three-dimensional reality?

Stay with **Edge** and see.



By just touching the screen Dave had hit a treble 17 whilst playing Darts on 42 Old Time Classics, sadly he was aiming for double 5 to win the championship.

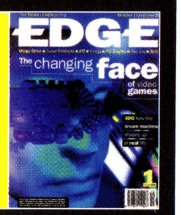
Touch! Generations

nintendo Wi-Fi connection

link up to play

NINTENDO DS™ Lite

Psygnosis' *Microcosm* pits your blasting skills against miniaturised foe *inside* a human body



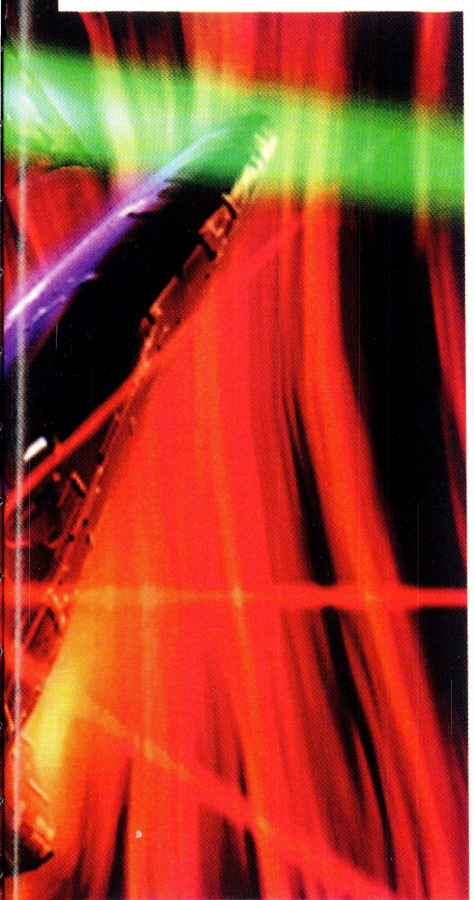
It's one of the most expensive home videogames to date. It's the work of five programmers. It features specially commisioned music from Rick Wakeman. And its game code accounts for only one per cent of the data that fills its CD. Welcome to the world of *Microcosm*, the first game to feature on an **Edge** cover.

First thing that hits you is the stunning intro sequence – 400 seconds of CD film footage

Microcosm's box artwork – like most of the in-game graphics – was rendered using £10,000+ Silicon Graphics Indigos. The original file takes up 35Mb of storage space

EDGE magazine October 1993

Intravenous After Burner: the making of a Microcosm



For many software companies CD-ROM is just a buzzword. For **Psygnosis,** it's buzz*work:* they've been slaving away for the last three years preparing for the CD revolution. *Microcosm* is their first CD title; **Edge** speaks to the disc jockeys

Since its inception in 1984, Psygnosis (*Shadow Of The Beast, Lemmings*) has constantly looked towards new technology. They were among the first to show what the ST and Amiga could do, the first to show off CDTV's potential, and were developing on CD while everyone else was just listening to them.

The first fruit of their labours is *Microcosm* – a shoot 'em up cross between *After Burner* and the movie Fantastic Voyage. The game is only currently available for Fujitsu's CD-based FM Towns, but versions for PC CD-ROM, Mega CD, CDTV and 3DO are already in production.

When you load up *Microcosm*, the first thing that hits you is the stunning intro sequence: a full 400 seconds of digital film footage dragged off CD. It features 3D images rendered using £10,000+ Silicon Graphics Indigos and live-action footage. **Edge** spoke to lead visualiser **Jim Bowers** about the creative process.

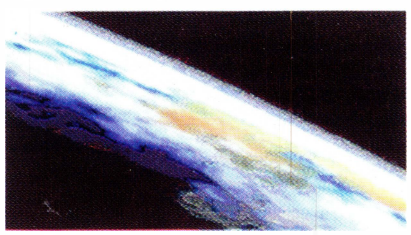
Edge You were mainly responsible for the intro: what planning was involved?
JB 'The intro didn't have a script or storyboard – we just made it up as we went along. We had a rough idea of what we had to do, but the deadline was so tight we just had to jump in and do it.'
Edge So just where did you start?

Continued next page

Cosmic strip

Microcosm's Bladerunner-inspired intro lasts 6 minutes, 40 seconds, and runs at 15 frames per second. To give you an idea of how the sequence works, we've broken it down into 26 separate images, at roughly 15 second intervals...

1 Time: 2051. Place: Bator system, planet Bodor. The camera slowly pans across the planet, settling on a sprawling city below



2 We descend past the neon towers and into the depths of the cybercity itself. The teeming backdrop is a simple 2D cyclorama

Photograph: Adrian Ford

Director and second unit cameraman of the *Microcosm* movie: intro man Jim Bowers (left), and vein designer Neil Thompson (right), outside Psygnosis' headquarters in Merseyside, Liverpool

'Just one image can take up a full meg – we're talking 16 million colours'

Jim Bowers, lead visualiser

JB 'It was actually Neil's idea: we were having a brainstorming session, and the old 'inside the body' films sprang to mind. We did the initial design work and graphics on the Amiga, and then we got the Silicon Graphics machines.'

Edge What made you choose Silicon Graphics workstations?

JB 'Well the Amiga can do most things that the rendering software can do, but the Indigo is just so much faster. It's designed around a dedicated graphics system, but can do many other things. We use the same software as the computer-generated TV commercials, and films like The Lawnmower Man.'

Edge Presumably then you need a lot of storage space?

JB 'With *Microcosm* we're talking gigabytes. One of these images can take a full megabyte for just one frame – we're talking 16 million colours. The box cover was generated using 3D models on the Silicon Graphics and the finished single image took about 35 megabytes.

'We had a file server with lots of hard disks strung together; I think in the end we had about six gigabytes.'

Edge That's a hell of a lot of memory!

JB 'Yeah, one of the main things about CD is the scale: for instance, *Microcosm* probably contains more computer graphics than any feature film ever made! And it was done in the same time with less people.'

Edge How do you create the 3D graphics?

JB 'A lot of the vehicles you see in the game – the hunter-killer, the spacesuit, the hoverpod – were built a while ago on the computer in 3D. We generate each form like you would in an Amiga package, but there's more to it than that: you have to model everything, apply textures and test it all the time to see if it looks okay.

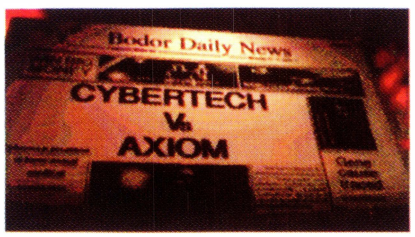
'I think possibly the spacesuit's the most fun: all the limbs articulate. I also built the end-of-level guardian creatures, based on **Nick Burcombe**'s designs. I animated about half of them and **Paul Franklin** animated the other half.'

Edge What were the toughest scenes to animate and render?

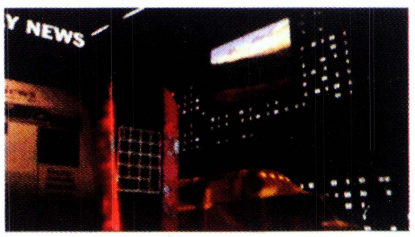
JB 'Probably the street scenes: you're trying to give an impression of it being a

Continued

3 The camera zooms into a newspaper stand. As the headline attests, the city is gripped by a corporation war: Cybertech versus Axiom



4 The view pans right to reveal a busy street scene, following a 3D model truck as it thunders across the screen and out of view



5 The camera pauses at the base of the Cybertech tower. More traffic cuts through the smoky scene and a train trundles overhead

street, something that's recognisable, and it's really hard to do. You stick a couple of buildings in and suddenly realise they have to be lit in a certain way. And then you stick more buildings in, and it just gets more and more complex.

'Another hard part was the rooftop sequences: filling a rooftop which is meant to be flat, making it look busy. That's quite a tricky one: the detail you put on it, deciding what to do, what to leave off. I tried to make it look fairly functional, then I fit the people within it that way.'

Edge How did you manage to include footage of real people?

JB 'We filmed some of the team against bluescreen. A lot of time was spent building props and doing all the costumes: **John Harris** did some uniforms for us. That took about three weeks. Then we spent a week just filming, going through different lighting set-ups.

'It was quite exciting. We had to do it at night as well; we were doing it in an office with windows everywhere and there was no way we could do it during daytime.

'We recorded onto tape using a S-VHS camcorder. You select a bit you think will be useful, grab it and put it through our custom-written image processor that extracts a transparency mask on the colour blue. Then you composite it in with the actual scene; there's a compositing tool in the software which lets you take a number of layers and place them on top of one another.'

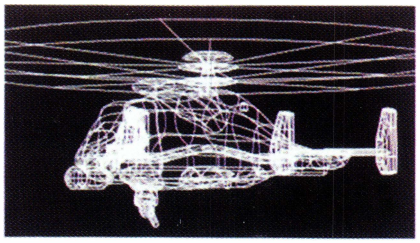
Edge How did you make the helicopters shiny – like the H-Ks from Terminator 2?

JB 'Again it's all done on computer, using material techniques, texture maps; lighting's also very important. When we did the bluescreen video, we basically had two keylights either side and we found we were getting it very bright on the sides. To recreate that on the computer, I put very intense lights either side and found I was getting a matching of live action with the generated footage.

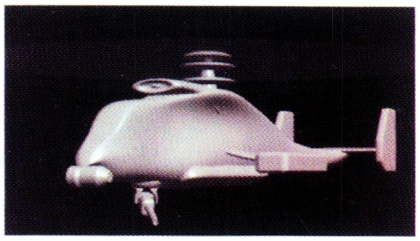
'It also helps if you you mess around with the textures, if you flaw the texture, try not to get it looking perfect – one thing

How 3D is rendered in Microcosm

Step one: A linear display of the 3D model is produced in wireframe form, showing the construction lines of the helicopter. This basic graphic can be manipulated in real-time, allowing the artist to work out his animation routines

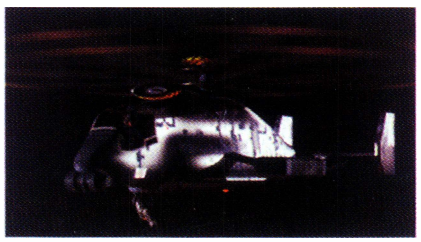


Step two: The helicopter is simply shaded and coloured to show its three-dimensional surface. There are no textures, effects or shadows at this stage, it's just a basic representation of the model's form to see whether it looks right or not

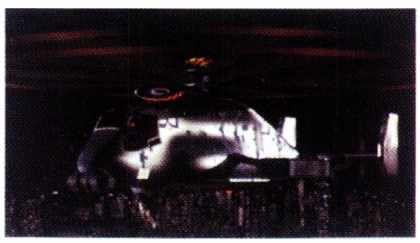


Step three: Images are mapped onto the surface for added detail and texture, similar to decals on a model aircraft. Much of the detail is made from simple 2D images drawn on an Amiga and imported into the rendering program. Different symbols and textures can be wrapped around the 3D model in a variety of ways

Step four: The lights in the scene are changed from 'no-shadow' to 'ray-traced', which means that they now cast shadows correctly. At this point the artist can try different lighting set-ups to see which one provides the best images



Step five: Different images can easily be layered on top of each other – or 'composited' – using the rendering software. In the previous image not only did the computer render the RGB colour information, but it also generated a transparency mask. The helicopter is then easily 'pasted' on top of another image – in this case a view of Bodor city



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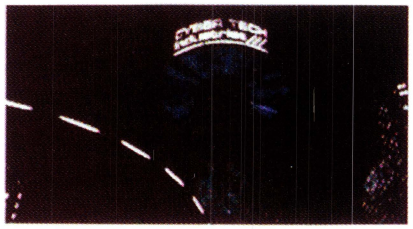
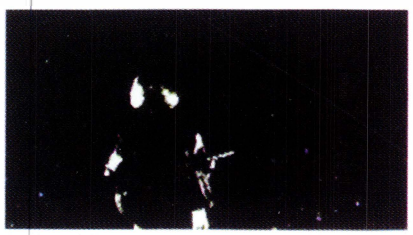
6 A couple of hoverjets fly past as the camera tilts up, coming to rest on the glowing crown of Cybertech's headquarters



7 The skyscraper is teeming with security guards: real people were filmed against bluescreen and composited into the 3D scene



8 3D animator Nicky Carus-Westcott dons military headgear while scanning the city below for any signs of enemy activity

techview: CD-ROM

continued

I hate seeing is a perfect 3D model; we're trying to recreate imperfection.'

Edge Just how complex are these scenes you're generating?

JB 'In the opening street scene there are 241 models, 22 of which are animated. When it comes to triangular polygons, you've got 85,331 and there about seven light sources in that particular scene. I suppose that would have to be the most complex scene in the whole intro, and in the whole of the game.'

Photograph: Adrian Ford

Looking suspiciously like a colonial marine from Aliens, Chris Moore dons a *Microcosm* uniform. Players were shot against blue-screen and composited into the 3D scenery

Edge The cityscape background looks massively complex; how do you do that?

JB 'The background is a very simple cyclorama. It's a rendered city: I've taken a frame of the city and texture-mapped it onto the cyclorama.'

Edge Just like a 3D image projected onto a 2D plane?

JB 'Yeah, it's quite a speedy thing to do. We cut as many corners as we can. If you've got a static background with no movement on it, you don't go rendering the background every time, which could be horrendously complicated. We also use a lot of compositing; it's just the most simple, efficient method.'

Edge But it's quicker to render for the FM Towns because it only shows 256 colours?

JB 'No, everything's still rendered in 24-bit, millions of colours and then we downgrade them with compression techniques. They're then given to the programmers who crunch 'em onto disk.'

Edge In the game proper, how did you do the vein walls?

JB '**Neil Thompson**, the second lead visualiser, did the legwork on that technique along with **Gorvan Corbett**. It's a series of loops: you set up a series of sections, and you make sure they continue one on from the other. You have limited visibility as well, so you don't have to put hundreds of animations in the background.'

Edge So the dark and moody atmosphere hides a multitude of sins?

JB 'It certainly does!'

Edge Over to you **Neil Thompson**; how did the veins come about?

Neil Thompson 'The veins were the first idea, and they were essential to the product. We tried a couple of simple left, right junctions and then it got more and more complicated, and now there are thousands of veins in there.

'The idea was to get a visual feast and tie a game in there somewhere as well. We knew that gameplay on CD was going to be limited, and the real strength of CD is that you can get piles and piles of graphics in.'

Edge So how are the veins created?

NT 'It's basically a cylinder: you can randomise the points on a tube to give it an uneven textured effect. The tricky bit was trying to get them to wrap, because you can't run 2,000 frames and then duplicate them, so we had to think of a way of doing them in short bursts. I think they ended up being in short 20-frame bursts, so you get a straight, and then a junction, and then you go back onto the same straight again, all

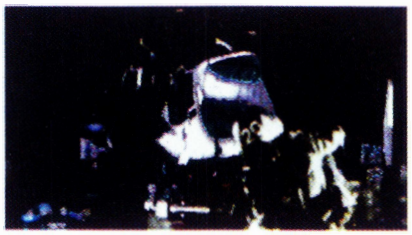
Photograph: Adrian Ford

***Microcosm*'s lead programmer, John Gibson, getting to grips with the FM Towns machine**

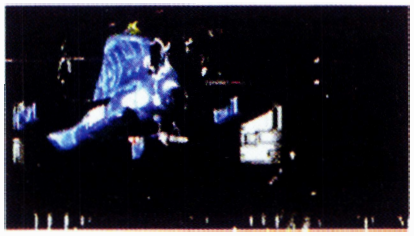
'In the opening street scene there are 241 models and 85,331 polygons'

Jim Bowers, lead visualiser

9 **Suddenly a huge helicopter gunship appears, as a real-life trooper looming in the foreground of the screen waves it on.**



10 **The chopper skims across the rooftop to rendezvous with an incoming medical transport carrying Korsby, Cybertech's boss**



11 **Meanwhile, a 3D rendered exoskeleton patrols the perimeter, walking in front of and behind live action guards**

done to save memory.'

Edge What, for you, is the next step?

NT 'I'd like to see lots of surreal stuff. In computer graphics everything's too clean cut, too obvious. Everyone does big spaceships, planets, all that sort of stuff. Not more imagination, but a bit more flair.'

Edge How much of the game's potential do you thing you've fulfilled?

NT 'About 25%? It could have been a lot better, but we couldn't justify spending five years doing it. By then, people would have had all sorts of games out and we'd have missed the boat. This way we're first in.'

But pretty

pictures do not a game make: without some heavy code, all those lovely 3D images don't do very much. The man who injected life into the veins of *Microcosm* was **John Gibson**, the project's lead programmer.

Edge What's so special about FM Towns?

John Gibson 'The most significant things are its CD-ROM and its graphics. It has 2Mb of RAM – that's the minimum configuration – and we use 1.5Mb as a CD buffer, with the rest of it as a workspace and for the program itself.

'Everything on the Towns is a sprite: the film was all sprites, everything that's laid on top of it is a sprite – the only thing that isn't is the control panel! You can have up to 1,024 16×16 sprites on screen so you just bolt them all together like a sheet of postage stamps. That's the best way of doing it, as there's a sprite controller in there which leaves the 386 processor to do lots of other juicy things.'

Edge What difficulties did you encounter coming to CD games?

JG 'Obviously it's the sheer volume of the data: the principle problem is getting the data off the CD quickly enough. Ultimately that means you have to compress it something rotten; we've got some pretty sophisticated compression techniques but because you've got to decompress the stuff so quickly, that limits how much you can compress it in the first place.

'When the film comes from the Silicon Graphics, it's three bytes per pixel, so you're talking 108K per frame. When we get it it's in a nibble per pixel format which comes out at 18K, and we can get them right down to 9K. It doesn't lose a lot in quality: the only thing you really notice is a bit of banding. Because you haven't got so many colours, you don't get the same sort of anti-aliasing.

'The CD theoretically can only supply us with around 7·5 to 8K for each frame, so we're always running a bit over the top. But there are ways of getting round that; a lot is to do with designing efficiently.

'It runs at 15 frames a second – it's fast enough, but it would have been nice if it had been 20. To do that, we'd have had to make the images a lot simpler and it wouldn't have been so impressive. We opted in the end for more complex images at 15 frames a second rather than black screens at 20 frames a second!'

Edge What else can the CD format do?

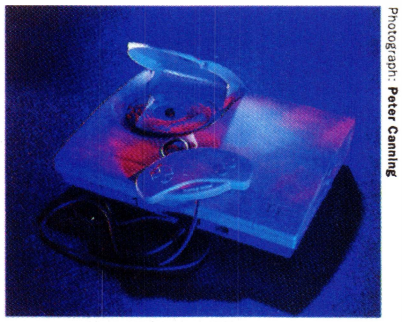
JG 'You can use it for giant data tables as well. You can speed up all the processing that way: instead of the processor doing the maths, you do it on a utility and store the data in a table. It might be a 64 or 128K table which you can't load in off floppy disk, because it stops the game. But because the CD always loads stuff in about five to ten seconds before it's needed, you can load these tables in and when you've finished with them, throw them away, because you can load them in next time you want them.'

Edge The Silicon Graphics images are 24-

Graphic artist Jim bowers – from kitchen designer to city builder in just six years

Photograph: Adrian Ford

Hardware: FM Towns Marty



Photograph: Peter Canning

The FM Marty console – baby brother of Fujitsu's stunning FM Towns

Fujitsu stole a march on their competitors five years ago when they released the first CD-based computer in Japan. The oddly-named FM Towns was (and still is) ahead of its time, running a fast 32-bit 386 CPU with a full 16 million colour palette.

A home console version was launched earlier this year. The equally oddly-named Marty boasts a CD drive, internal 3·5" HD floppy disk drive and a smartcard slot, all for about £500. Marketed as a games machine, it comes with a dinky three-button joypad, although you can also get a mouse and keyboard for FM Towns compatibility.

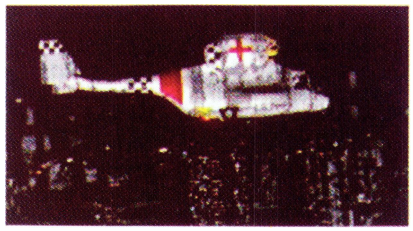
The Marty has the same spec as a low-end Towns, running at 16MHz. It has a screen resolution of 307,200 pixels (640×480) and can display up to 32,768 colours on screen. The majority of graphics are generated using a dedicated sprite engine – with the potential for 1,024 16×16 hardware sprites.

It supports six-channel FM and eight-channel PCM stereo sound, and the Marty has AV and S-VHS ports, plus mike and earphone sockets.

But thanks to Fujitsu's parochial distribution and marketing policies it's unlikely the FM Towns will ever be sold in large quantities in Europe, although the Marty is now being featured in several big US games mags.

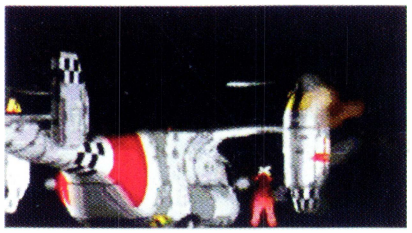
continued next page

12 The medical transport carrying Korsby meets up with the gunship and performs a dramatic flypast en route to the CT tower

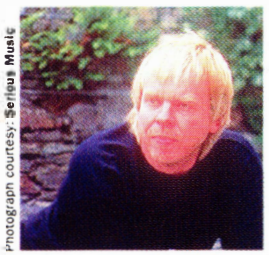


13 Safely inside Cybertech airspace, the gunship peels off and lands elsewhere on the sprawling rooftop

14 The medical transport touches down in the background, while someone out of focus in the foreground looks on



techview: CD-ROM



Photograph courtesy: Serious Music

Rick Wakeman: *Microcosm*'s maestro

Sound tracks

Microcosm's ambient music was written by ex-Yes keyboardist **Rick Wakeman.** His involvement with the project started three years ago when he met some of the Psygnosis management at a concert. 'I knew Psygnosis because of *Lemmings*, which my kids play,' he said. 'They asked me if I'd ever thought about doing music for computer games, and I said yes, but it's unbelievably inhibitive.'

With the advent of the CD format, Psygnosis were able to offer Rick the freedom to write his music under normal recording conditions – which is exactly what he did.

'I was in the studio for eight or nine days, and then went back for another two days. It was a great thing to do and I'd love to do some more... I was able to use the full studio facilities and put out some music that I'd be delighted to appear on a normal CD. I really felt part of a pioneering project.'

Choosing instruments he thought would be most suited to the project, Rick used a Korg 01/W Pro-X, a Kurzweil 2000, a Korg Wavestation, a Roland JD-900, an Ensoniq SQX, and several others from his extensive collection of synths and keyboards.

It was all recorded onto the Steinberg Cubase system and parts of it were transferred to a 24-track Otari for tweaking. It was mixed onto DAT (Digital Audio Tape) at a high sample rate of 48kHz as against the normal commercial rate of 44.1.

Inner space

Photograph: Peter canning

Microcosm genuinely fills up an entire CD – all 478Mb's worth. **John Gibson** did some rudimentary maths to calculate what percentage of the disk was taken by the different types of data:

CD Audio	163Mb	65.9%
Total code	15Mb	34.1%

The 315Mb of binary code is broken down into the following data:

Rendered graphics	298Mb	62.3%
Other graphics	8Mb	1.7%
Sound samples	7Mb	1.5%
Ancillary data	1.6Mb	0.3%
Game code	0.4Mb	0.1%

Continued

bit, millions of colours – so how do you use them on the Towns?

JG 'We've got utilities that begin by degrading the image, then in the case of the Towns we have a palette of 256 colours, but it's not 256 colours all over the screen. The screen's like a series of 16×16 cells and each cell can have a selection of colours from that 256 colour palette. Once that's been done, the data's compressed and presented to the programmer.'

Edge Is the lack of colour a limitation?

JG 'One of the big advantages of the Towns is that you can run it in a 32,000 colour mode. As long as you're careful about the images, 256 colours is more than enough. In fact the utility often generates less than 256 colours – about 220 – so it's not really at the edge of our limitation.'

Edge How do you get all that data from the artists?

JG 'We've got a network so all the Silicon Graphic Indigos, all the PCs, all the Macs are all joined together and we've got a file server, like a central pool for everything. Say Jim's produced a 50-frame film on the Indigo: the utility will pick those 50 frames up, choose the best palette for that film, degrade the image by that palette, pack the data and spew out something thing that the Towns can take. My PC's on the network, so I can take and read that file from the network and can send it straight to the Towns – there's a scuzzy [*SCSI*] link between the PC and the Towns. Then we put the data on a hard disk which acts like a pseudo CD to try it out and check it.'

Edge How long do the non-interactive movie sequences last?

JG 'We generated around 44,000 frames of animation.'

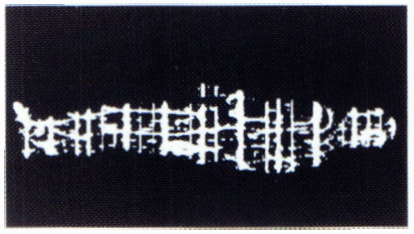
Edge How do you archive that stuff, and how do you play it all back?

JG 'You've got to be careful how you lay the CD out to cut down the seek times. That's one of the biggest problems: you don't want to go from one end of the CD to the other, because it takes so long. So there are certain files that are common to various levels in *Microcosm*.

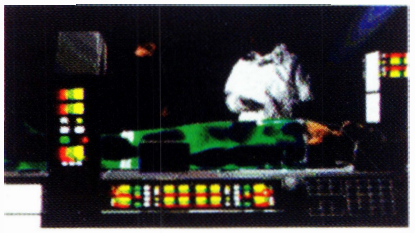
'There's a core program that's there

15 **The rendering software lets you pull focus like a real camera: 3D animator Paul Franklin reports that the plane has arrived**

16 **In Medical, Korsby's body is scanned. The wireframe form was rendered on the Indigo, and touched up on an Amiga**



17 **Treacherous Dr Knowles and an Axiom agent discuss the imminent injection of mind-controlling devices into Korsby**



'For the initial development *Microcosm* cost between $600,000 and $750,000'

Ian Grieve, licensing manager

Photograph: **Adrian Ford**

The brains, ideas and marketing muscles behind *Microcosm*: (left) lead programmer John Gibson; (right) conceptualist David Worrall, and (centre) licensing and liaison manager Ian Grieve

all the time, which contains most of the stuff like reading the CD, handling the sound, changing screen modes, god knows what else, and then every level is an overlay that's loaded in with its own unique piece of code.'

Edge It seems that you have masses of cinematic background for the intravenous sections – how do you handle it all?

JG 'A lot of it is broken up into small films, no more than about 50 frames, and they're all chained together to produce the final thing. That's why you can come along one part of the brain and branch one way, branch another way. In just one level there's probably something like 1,500 frames – say 30 films at 50 frames each. And you've got that six times over, for each level.'

Edge How much more interactive can you make CD games?

JG: 'All the CD does is just keep reading files until something tells it not to. It's a standard 150K/second drive. 3DO is 300K/second, and probably this new Amiga CD console will have a 300K, too. [**Edge**: *it does.*] Anyone producing a CD drive now would be mad not to have a 300K drive.

'The real restriction with interactivity is the rate at which you can get the stuff off the CD: 150K/sec is a severe restriction; 300K/sec is going to make a hell of a lot of difference. At the moment we can just about handle a three-way branch, if you try to go up to four it's getting a bit iffy. We could have four branches but we'd probably have to drop the frame rate after that junction because the CD's got to load another set of data. It'll solve itself as the hardware gets more sophisticated.'

Edge Is CD really the way forward?

JG 'I can't see any way other than CD. Consoles are all very well but I suspect they'll end up going the same way as the Spectrum. The medium of the future has to be CD – the only thing we've got to watch is we don't say we've got 600Mb of storage space, let's bung anything on there and sod the game: that's the biggest danger.

'People are gonna think, you buy a CD, and you want 500Mb of game. When

Continued next page

18 **Lee Carus-Westcott (left) and visualiser Jim Bowers play the bad guys; Japanese actors spoke lines dubbed on later**

19 **In case Dr Knowles chickens out, Axiom have provided some persuasion: Neil Thompson and Mike Waterworth get heavy**

20 **The door opens and the baddies spin around: Cybertech have discovered the plot to take over Korsby's body and mind**

techview: CD-ROM

Photograph: Adrian Ford

Richard Browne, designer and producer of *Microcosm*, through the round window

'With so many ideas, the big problem was bringing it all to an end'

Richard Browne, designer/producer

Continued

in fact a really good game can probably fit in a single meg. If we did it as a two floppy game on the Amiga, it would have five levels, but it's a CD product so it has 200 levels. A good game doesn't have to have lots of graphics and lots of sound, but a good game can be enhanced by them.'

Edge In that case, how big is *Microcosm*?

JG '*Microcosm* totally filled a CD up. Obviously there's quite a bit of audio on there as well, which is just played like an ordinary CD. The sound effects are totally separate, they're data just like any other data that's loaded off the CD.'

Edge How much of **Rick Wakeman**'s music is there?

JG 'There must be something like 200-250Mb of music. There are eight tracks, and they're all about a minute each, and the intro's about three minutes, so there's about 12 minutes of audio in there.'

Edge Just how does the CD music know when to play?

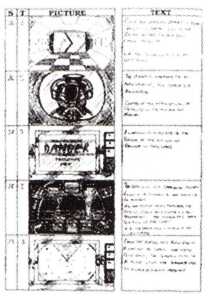
JG 'It's all synched: for example to play an audio track, you tell the CD to seek to where the audio track is and sit and wait, so when you get to the point in the game where you want it to play, it can start straight away. And then you either let it play until it's finished, or you can tell the CD: forget the audio track, go back into data mode and start loading files again.'

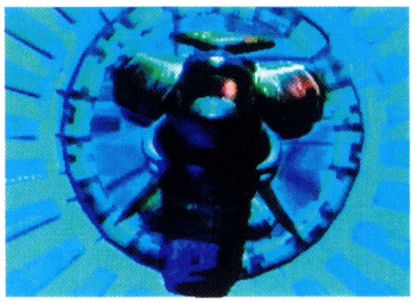
Edge End-of-level bosses are all rendered films, so what happens if you kill the boss before the film has finished running?

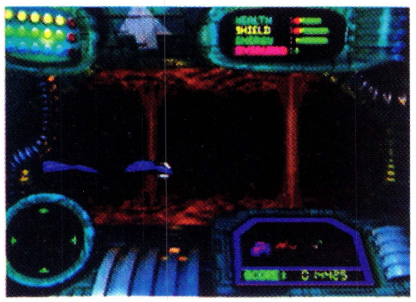
JG 'The obvious way to do it is just play a film and when you get to the end you say, have you hit it enough times? Yes you have, he dies; no you haven't, so you die. But it doesn't have to work like that: there's a facility within the core program to get to anywhere in the film, stop and restart somewhere else. It does take a bit of time because you've got to tell the CD to stop what it's doing and go off and seek somewhere else. There's a certain delay there, so we bring up some simple flashing screen to cover the fact that we're killing time while the CD's trying to find the next film – something like the player's face that can be stored in memory all the time and then just shoved into the video RAM when it's needed.'

Edge For you, what's the best thing about *Microcosm*?

JG 'I was pleased that it all came together. Having five programmers, half-a-dozen artists and a couple of musicians all working together is a relatively new thing – certainly in this country anyway. And the fact that it all came together, I think that is the greatest achievement. Some of the guys that programmed it hadn't been near a Towns before, and some of them hadn't even programmed the 386 chip before *Microcosm*. And yet they did a damn good





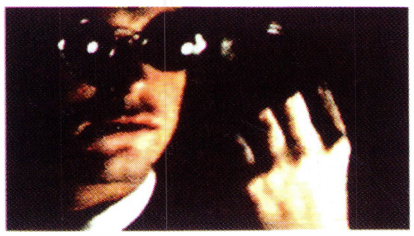


Every detail of *Microcosm* was documented in detail before work began. Designer Richard Browne's storyboard (*top left*) runs to 46 pages and, as you can see, the game sticks pretty closely to it. On entering the first waystation, you proceed along the neon-lit corridors (*top right*); where you are introduced to the series 7 hoverpod (*bottom left*); before entering the left lung to battle enemy ships while avoiding the filaments that litter the lung cavity (*bottom right*)

21 **Cybertech's security troops have arrived, and Axiom's men are cut down in a hail of fit-enducing gun fire**

22 **As Cybertech's men examine the debris, the executive officer's foot clinks against something on the floor**

23 **Paul Franklin, for it is he, picks up the glassware – there's a syringe and a phial of some description**



job of it because they didn't have to do all the low-level stuff, that was all done for them. So from my personal point of view, the greatest achievement in the game is the fact that it all actually works!

Photograph courtesy: Psygnosis

Ian Heatherington, MD of Psygnosis

Photograph: Adrian Ford

The *Microcosm* team: (back row, l to r) Mike Anthony, Jim Bowers, Paul Franklin, Stuart Sargusson, Simon Moore, Nick Burcombe, John Harris, Garvan Corbett. (Front row, l to r) Nicky Carus-Westcott, Mike Clarke, John Gibson, Lee Carus-Westcott, Mike Waterworth

Despite their stunning graphics, both Psygnosis' *Microcosm* and the Mega CD version of *Dracula* have been criticised for simplistic gameplay. **Edge** suggested to **Ian Heatherington**, joint Managing Director of Psygnosis, that the first CD titles were 'all show and no go'.

Ian Heatherington 'When we produce a new product, something like *Microcosm*, technologically it's very state-of-the-art. But it's being manufactured effectively to go on something like the Mega CD. The Mega CD player is a *Sonic* player, a *Mickey* and *Donald* player. With an inexperienced gamesplayer, you cannot afford to present radical gameplay options.

'It's no good going along with a *Monkey Island 2* or a super-sophisticated role playing game – this is not an interactive movie: this is a videogame. It's engineered as a videogame, it plays like a videogame – that's all it was ever intended to be. What we're trying to do is bring cinematic technology techniques to the videogame experience. If that was our objective, then we've been successful.

'*Microcosm* and *Dracula* are targeted at the existing marketplace on CD. In some ways I'm pre-empting criticism of the product: because people look at it and because it looks so wonderful, they probably expect more from it. It's not actually meant to deliver more.

'We're also doing things like *The Last Action Hero*. We're now a member of the Sony group – that's for a lot of reasons; we need access to intellectual properties in a privileged way. But within the concept of: 'Here's an intellectual property, buy the licence, develop the game in six months, and do the best you can', you cannot be technically innovative; it has to be formula-driven because the most important thing is time; nothing else matters. So the process defines the output, unfortunately.

'What we've got is something like 40 man-years' of experience in producing these games. We have the technology, we're on all the CD-ROM formats: we even know about a few that you don't know about yet.' **[Edge:** *don't count on it.*]

Edge Are you happy with *Microcosm*?

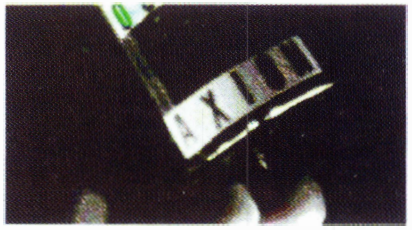
IH 'I think *Microcosm* has defined state-of-the-art. If you ask any creative person, are you happy with what you've produced, well no they're not; they never are. And that's what drives them.

'But with what we've learned from our experiences to date, we can go on and make some really staggeringly good products.'

Credits

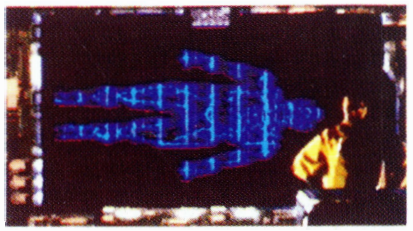
Graphic visualiser:	Jim Bowers
3D animator:	Nicky Carus-Westcott
3D animator:	Garvan Corbett
3D animator:	Paul Franklin
2D animator:	John Harris
2D animator:	Colin Dempsey
Lead programmer:	John Gibson
Programmer:	Kenny Everett
Programmer:	Simon Moore
Programmer:	Mike Anthony
Programmer:	Andrew Toone
Visualiser:	Nick Burcombe
Visualiser:	Neil Thompson
Music:	Rick Wakeman
Sound effects:	Kevin Collier
Sound effects:	Mike Clarke
Utilities:	Stuart Sargusson
Concept:	Paul Frewin
Concept:	David Worrall
Designer/producer:	Richard Browne
Project manager:	John White

24 **Too late: Axiom's miniaturised devices have been injected into Korsby. Axiom now control the head of the head of Cybertech**

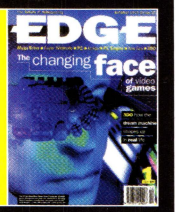


25 **Enter Jeff Bramfitt playing one of Cybertech's top brass. He explains the mission you are about to embark upon**

26 **Piloting a miniaturised craft, you must battle through Korsby's body and destroy all of Axiom's implants. Game on...**

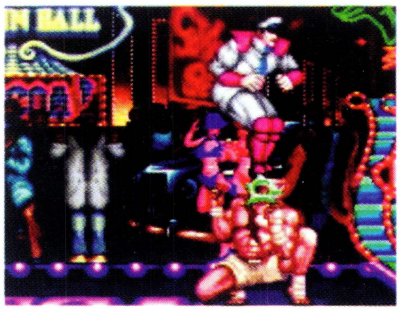


testscreen

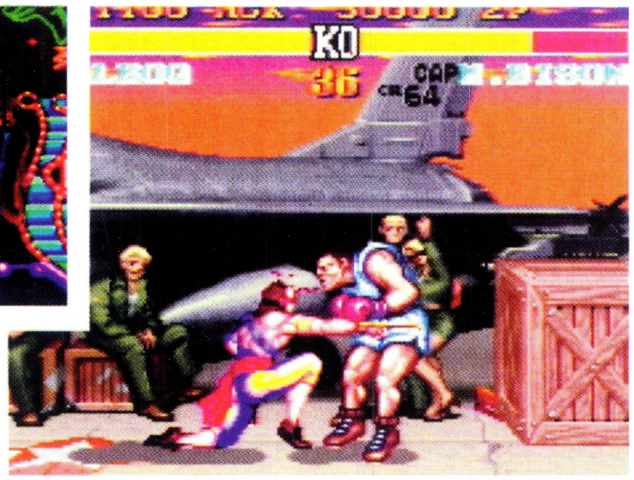


E1's Testscreen section presents an unusual concept for reviews: each game has a write-up, screenshots and rating contained within half a page (or, for certain releases, just a quarter), with further analysis of key titles featured later in the issue. It's certainly a different way of doing things. But will it last?

Game: **SFII Turbo**
Format: **SNES**
Publisher: **Capcom**
Price: **£90 (Jap import)**



Vega relies on cunning and guile to defeat Sagat... sort of



At last: real, proper two-player boss-on-boss action without resorting to Game Genie or Action Replay codes that turn their faces blue

The prayers of *Street Fighter II* devotees have at last been answered. This latest version of *Street Fighter II* contains both Championship gameplay, and a Turbo edition with four speed settings (plus six hidden ones), ranging from 'pretty quick' to 'ludicrously rapid'.

The Turbo game also contains the long-awaited new moves, such as Chun-Li's fireball or Ken and Ryu's mid-air hurricane kick, and has tweaked some of the old moves so that they're longer and harder.

In both versions, there are new frames of animation, the backdrops have had a fresh coat of paint, and there's extra sampled speech. But not all the changes are for the better: the option and character screens aren't as slick, and the game doesn't look quite as polished.

However this is small potatoes compared to the improvements to the gameplay. There can be few *SFII* players who won't welcome four new characters, new moves and a massive injection of speed.

You can see why Sega were less than happy to see a Turbo edition appear on the SNES before the Mega Drive has even had a taste of the six-button beat 'em up. God knows what Capcom are doing to appease the Sega management: it's quite possible MD *SFII* will include all the versions so far *and* have new characters and backdrops. Until then, this is the ultimate beat 'em up: no other has the same characters or moves – or the sheer finger-aching, mind-numbing gameplay.

If you own SNES *SFII* it's still a tricky decision whether you should buy *Turbo*: at current import prices, probably not.

But if you've yet to be introduced to the genteel art of street-fighting, and have a few pounds to shed, *SFII Turbo* is the one to get.

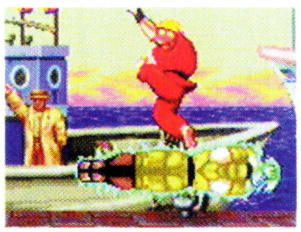
Edge rating: **Nine/10**

Game: **SFII Champion Ed**
Format: **PC Engine**
Publisher: **NEC**
Price: **£85 (Jap import)**

Quietly, without all the hype surrounding the SNES and Mega Drive versions, the PC Engine *Championship Edition* has entered the street-fighting arena. The hardware may well be six years old, but it can still hack it when it comes to fast gameplay. With a few concessions, primarily in the sound department, PC Engine *SFII* is pretty much identical to the SNES version. None of the gameplay has been compromised whatsoever – there's all the same characters and moves (hell, there's even an extra rock on the floor in Chun-Li's stage).

Because it's the *Championship Edition*, you get to play all four bosses, and all of the bonus stages are included – no missing out the barrel section like with SNES *SFII*. And on the gameplay front there's little else to say. It plays as well as you'd expect; there are few unpleasant surprises and it very much comes down to personal preference, whether you like your hard kick and punch buttons on the front of the pad (SNES-style) or taking up a pair of buttons on a six-button pad.

These flaming Chinamen don't half get under your feet...



PC Engine *Street Fighter 2* supplied by **Console Concepts**: 0782 712759

Kindly old Zangief adjusts Balrog's belt (and no it isn't Vega: this is a Japanese version with the *correct* names retained, thankyou for asking)

And you can just imagine the sort of noise *that* made

And this leads us to the real problem. Having coughed up the cash for your card, you now realise that to play head-to-head you need to get a two-player adaptor and two six-button joypads. Suddenly, this is starting to become an expensive hobby.

Apart from a few patchy graphics the disappointment is in the sound. The sampled effects are coarse and the tunes are sub-Bontempi standard. A Super CD version would, of course, overcome this problem – Capcom please take note.

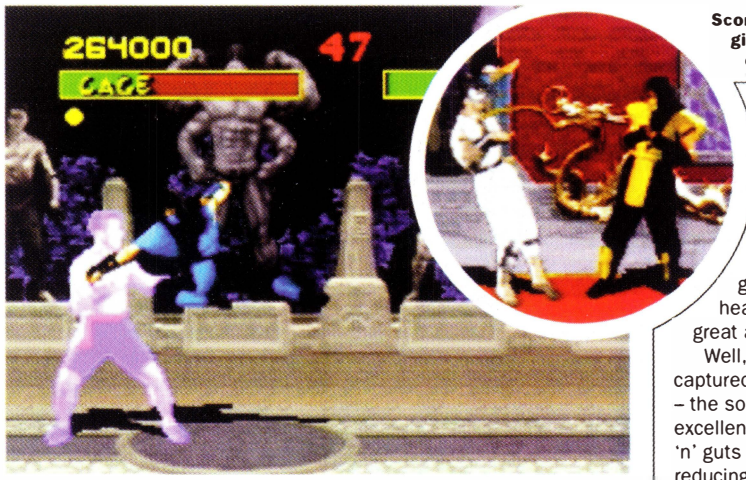
Edge rating: **Eight/10**

Game: **Mortal Kombat**
Format: **SNES**
Publisher: **Acclaim**
Price: **£60**

Mortal Kombat's huge 16-megabit cartridge is filled with the backgrounds, digitised sprites, oriental tunes and samples so familiar to fans of the coin-op. But the one feature that made it a hit in the arcades hasn't made the transfer: there's no mutilation, no blood, and no external, internal organs.

Apart from that, the home console versions are graphically spot on – the sprites look good and the animation is excellent.

Sonya hits Raiden with the dreaded 'Song For Europe'



***Mortal Kombat*'s special moves are at least varied: Sub-Zero has the ability to freeze his opponents, in readiness for a pummelling**

Midway's arcade original gave you stylish ultraviolence and special death moves to 'finish' your opponent. Tired of fighting? – then why not just tear off the other guy's head or rip his heart out? *Mortal Kombat* pulled no punches in its effort to dethrone *SFII*.

Explaining the changes made to the SNES version, Acclaim's European boss Rod Cousens denied rumours that Nintendo disapproved of the violence, instead saying that the SNES version wouldn't be as violent as the Mega Drive due to 'restraints of hardware' – ie The SNES's state-of-the-art 16-bit console couldn't do the gory graphics. Good one, Rod. But does the cleaned-up *Mortal Kombat* look right? Or has the reduction in gore literally ripped the heart out of what was a great arcade game?

Scorpion reels Kano in to give him a kicking at close quarters

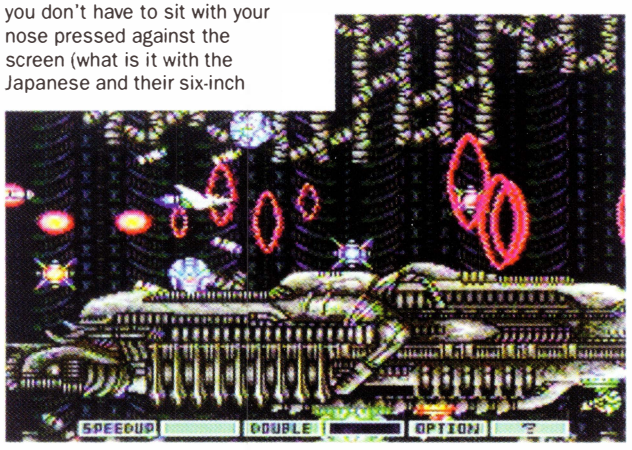
Well, Acclaim has certainly captured the look of the coin-op – the sound and graphics are excellent – but the lack of blood 'n' guts goes a long way to reducing what gave the game its weird appeal in the first place. Without the gory punchline, this joke just isn't funny.

Some people will have you believe that *Mortal Kombat* is the new 'king of beat 'em ups', but that distinction is definitely held by *SFII Turbo*, whose variety and sheer playability far outstrips *Mortal Kombat*'s limited appeal.

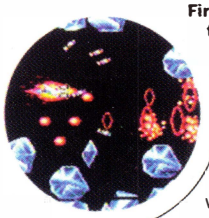
Edge rating: **Six/10**

Game: **Gradius II**
Format: **PC Engine CD**
Publisher: **Konami**
Price: **£60 (Jap import)**

So there you are. You've invested £300-odd in a brand-new grey import PC Engine CD, you've bought a new table to put the TV on so you don't have to sit with your nose pressed against the screen (what is it with the Japanese and their six-inch joypad leads?), you've scoured the ads to actually find yourself a copy of a game to play on it, and what have you come up with. Oh great, *Nemesis* again. Hardly the state-of-the-art, is it? A 1985 coin-op shoot 'em up, spiced up with different levels, but with the gameplay more or less unchanged. The words 'money', 'waste', 'complete' and 'of' spring to mind.



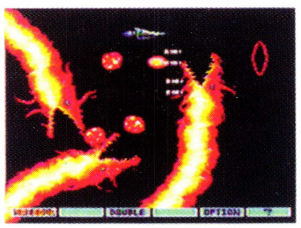
The third stage features detailed H R Giger-style graphics, with a parallax background that fades in out of the darkness



Fire and ice: blasting through the iceberg stage with shields on

But wait. *Nemesis* (or *Gradius* if you really must) was a truly groundbreaking shoot 'em up, and a brilliant one at that. This game is actually a version of *Vulcan Venture*, the third coin-op in the *Gradius* series, and it comes complete with the flaming fireball planets and colliding iceberg sections. Many of the levels will be familiar to anyone who's played SNES *Gradius III*, but they're all the better for a lack of slowdown. (There is slowdown, but bizarrely only early on when the big venus flytraps appear.)

The only bugbear here is the slightly uneven difficulty – even on Easy, it's terrifyingly hard at the end, and if you get killed (as you will), your chances of building up power-ups and making more progress are slim. But maybe that's just encouragement not to get killed.



First stage and already you've upset the flame dragons

The whole thing is topped off with some fabulous CD sound, using Roland's Sound Space system which, if you play with headphones on, gives you a truly frightening surround sound experience. The music and speech is great, and the whole thing's still more fun than practically any other shoot 'em up on any other system. It won't win many technical awards, but for gameplay, you can't do much better than this.

Edge rating: **Eight/10**

testscreen

Game: **Silpheed**
Format: **Mega CD**
Publisher: **Game Arts**
Price: **£60 (import)**

So, the game Mega-CD owners have been eagerly waiting for finally touches down.

Does it live up to the hype and high expectations? Well yes, sort of. There's no doubting *Silpheed*'s graphical excellence – from the moment the logo appears, you know you're in for a visual treat.

Moving at 60 frames a second, the animation is smooth and at times, the views are breathtaking.

The action is split into 12 levels, increasing in difficulty, and culminating in a space battle with a huge mothership.

Your ship, the SA-77, is very manoeuvrable, but it doesn't interact with the backgrounds as much as anticipated – the backgrounds act like, well, backgrounds. Some levels do require you to fly through canyons and over spacestations, but you'll soon wish that you had more control over the craft.

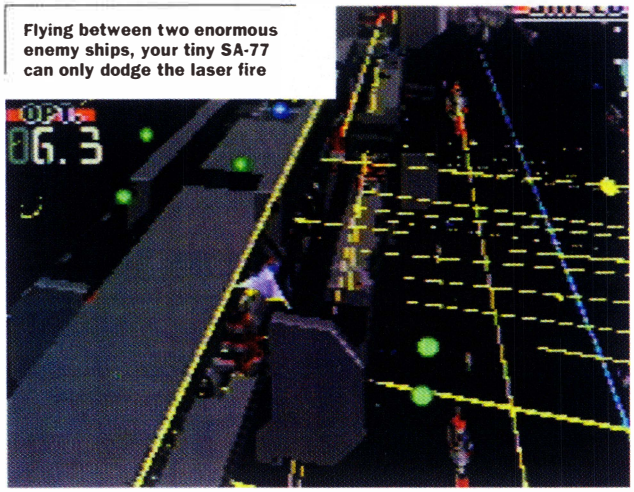
Fans of the coin-op *Galaga*, will feel right at home in *Silpheed*, as swarms of aliens fly in formation at and around your craft.

Comparisons with *Starfox* are sure to be made – beyond the obvious similarities, both use polygon-generated graphics. Although *Slipheed* is graphically superior, *Starfox* is more involving, and its bosses far outshine the pathetic motherships in *Silpheed*.

But Mega CD owners need fear not – *Silpheed* is still a good game. Although relatively easy, it's nice to look at and plays fairly well.

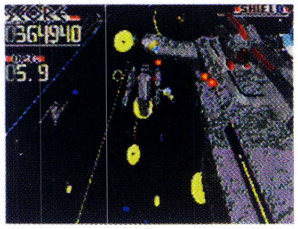
Let's hope Game Arts can engineer some gameplay to match their advances in 3D visuals in time for the launch of *Silpheed 2*.

Edge rating: **Seven/10**



Flying between two enormous enemy ships, your tiny SA-77 can only dodge the laser fire

Full power-ups and shields, but still there's the boss to fight



A hostile enemy convoy. Keep your head and you'll make it...

Game: **Inca**
Format: **CD-i**
Publisher: **Coktel Vision**
Price: **£39.99**

Inca is yet another release for Philips's CD-i system. But this isn't a bad effort, surprisingly. The machine's most interactive product to date, *Inca* could be the sign of things to come. Warmly received on a host of 16-bit machines, it looks set to enjoy some form of success, even on the CD-i.

In the game you play the part of Eldorado, and your task is to locate three great Inca powers: time, matter and energy, by travelling through space. *Inca* relies heavily on its puzzle element, and is definitely a tough game. Some of the puzzles are relatively straightforward, but most require a great deal of lateral thinking before they are solved and you can move on.

The puzzle sections are nicely interrupted by first-person action scenes, including excellent 3D space travel and shootouts with digitised actors.

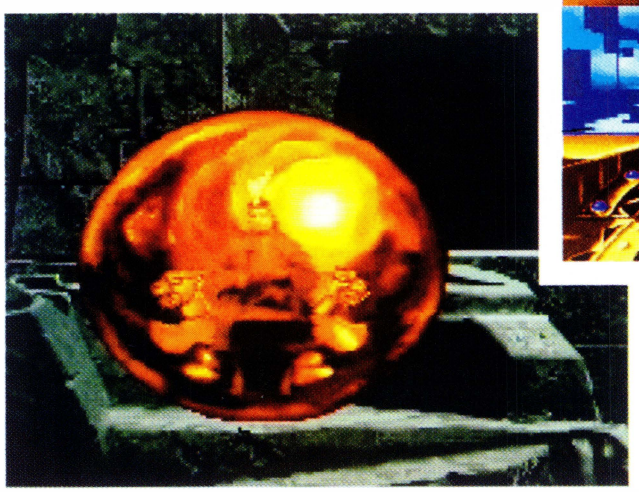
Graphically *Inca*'s a bit of a mixed bag. Some scenes look great, and some look great until they start to move. Sound is impressive, but there again, this is a CD product, so anything but 'impressive' would be disgraceful.

The main problem is moving around the game. You use a cursor throughout – and cursor-controlled games can be fiddly at the best of times, but this problem is made worse in *Inca* because of the awful controller with the CD-i.

Presentation is great and the whole package hangs together well. If you're expecting a fast-paced action adventure, *Inca* will leave you disappointed. But for gamesplayers wishing to exercise their little grey cells, *Inca* could prove a worthwhile purchase.

Edge rating: **Seven/10**

In level one your task is to catch and destroy the enemy ships before they escape



***Inca*'s intro sequence, in which the story is explained to you by animated figures inside a transparent golden ball. Very realistic...**

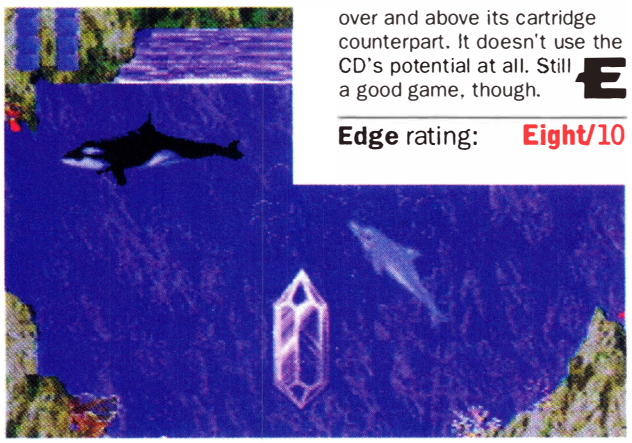
Game: **Ecco the Dolphin**
Format: **Mega CD**
Publisher: **Sega**
Price: **£50**

When it appeared on the Mega Drive early this year, *Ecco* wowed the punters with its enchanting graphics, slick animation, atmospheric soundtrack, and above all, its non-violent theme. Now the Mega CD version is upon us so we're forced to question what it contains that justifies its existence on a CD.

The answer is, not an awful lot. The first improvement is the addition of five extra levels. You also get QSound.

But the Ecco CD offers little over and above its cartridge counterpart. It doesn't use the CD's potential at all. Still a good game, though. E

Edge rating: **Eight/10**



By hitting the crystal with his sonar, Ecco can converse with the killer whale. What you can't see is the wonderfully mellow CD music

Game: **Lands Of Lore**
Format: **PC**
Publisher: **Virgin**
Price: **£36**

What is it about RPGs, for goodness sake? Why are there so many of them on the PC, and why are they mostly tedious?

You only need to hear the title to know that *Lands Of Lore* is an RPG, but then you'd expect that from Westwood Studios – the people behind *Eye of the Beholder 1* and *2*.

One of *LOL*'s animated scenes. Here a wizened King talks to his courtiers

In fact, at first glance you could be forgiven for thinking that *LOL* is another *EOTB*. There's the familiar forest, viewed from first person perspective; there are the brave heroes who only seem to walk in short bursts of exactly equal length; there are the cinematic cut-scenes.

Westwood have honed their RPG model to a tee now, and frankly *LOL* is a joy to play. It has an automap. It doesn't rely on tedious statistics which have no bearing on gameplay. It doesn't bother with weight limits, hunger or any of that realistic (ie annoying) stuff. Although at first it seems too easy, like you're simply being led through the game not playing it, it doesn't stay that way.

Lands Of Lore doesn't break any new ground, but for an RPG you'd be hard pressed to do better. E

Edge rating: **eight/10**

Game: **Viewpoint**
Format: **Neo Geo**
Publisher: **Sammy**
Price: **£225**

Again, this is another massive megabit title, but for once you can see where the memory has gone. Every single sprite has been rendered in 3D, predrawn and stored in memory. And the result is stunning: every creature, gun emplacement and missile looks like a solid 3D object: serpents dive in and out of the water with breathtaking realism, and the huge bosses are just stupendous.

These snakes dive in and out of their holes in stunning 3D

Destroy the giant crab's claws and its brain comes out to play

So much for aesthetics: what of the gameplay? Ah, this is where things fall down slightly. When all said and done, *Viewpoint* is still just a shoot 'em up, and not a particularly innovative one at that. Later bosses are stupidly hard to destroy and merciless restart points take you miles back into the level.

It has an addiction born of frustration and of the desire to see the graphics, but there's a high price to pay... and that's the inordinately high price you have to pay. E

Edge rating: **Seven/10**

Game: **Sunset Riders**
Format: **Super NES**
Publisher: **Konami**
Price: **£45**

One of the harder sections is this horse-riding bit...

With such dated gameplay *Sunset Riders* has a job making the grade – but it manages it. Just.

Whether it's the much underplayed wild west scenario, or the change of perspective that crops up throughout, it's a satisfying shoot 'em up packed with detail and a variety of solid gameplay. From the great intro, the graphics emulate the arcade game well – far better than the rather unspectacular Mega Drive version – the sprite handling and overall speed of the game never lag at all. If there is anything to moan about it's the lack of room for manoeuvre, with only a single plane for the player, and some annoying horse-riding bits where there's little chance to avoid what's coming.

For action this isn't a match for Capcom's old wild west classic *Gunsmoke*, but it's still great fun, and has amusing western music and speech thrown in, too. E

Edge rating: **Seven/10**

testscreen

Game: **Gunstar Heroes**
Format: **Mega Drive**
Publisher: **Sega**
Price: **£39.99**

Gunstar Heroes comes on a eight-meg cartridge, and features some of the fastest simultaneous two-player action you're ever likely to see on the Mega Drive. The graphics have a distinct cartoon feel to them, the backdrops are well detailed and the scrolling is very smooth.

Your character shifts at an incredible pace as he jumps, hangs, and climbs his way through each of the five futuristic levels, reaping death and havoc on just about anything that moves.

You have the choice of four weapons: lightning fire, force fire, chaser fire, and fire fire. Each weapon has its own strengths. Lightning fire is great for longrange attacks but not so good for closeup action, chaser fire homes in on the enemy and is a good allround choice, force fire sends out an unending stream of bullets, and fire fire is basically a flame thrower, designed for closeup mass destruction.

These flying characters must be defeated to get beyond the end of level one. Our hero is using the flame thrower for close work

One of the bosses from the dice palace looms infront of you...

You can only carry two weapons at a time, but they can be joined to form a totally new weapon. For example, the flame thrower combined with force fire creates a longrange flame thrower – ideal for killing just about anything and everything.

Although five levels in the game don't sound a lot, each level is huge – and just when you think you've seen off the last guardian, another one appears. It's quite demoralising: after using all your weapons and resources to finish off what you thought was the last boss, you just get another one, bigger and meaner, to take its place.

The action never lets up – not for a second – and by combining many mid-level bosses with hordes of enemies, *Gunstar Heroes* quickly becomes an immensely hectic game.

It looks good, sounds good and plays well, but after completing the game, you get no great urge to return to it, even with two players. There are no hidden levels to find, no secret screens – you get what you see.

Gunstar Heroes is great while it lasts, but it doesn't last long.

Edge rating: **Six/10**

Game: **Mario Collection**
Format: **SNES**
Publisher: **Nintendo**
Price: **£60 (import)**

Well, wonders will never cease. For once there's a Nintendo cartridge that offers something like value for money. With every rip-off merchant and his wife greedily eyeing the consoles it's nice, no, it's very surprising to see Nintendo pull a stroke like this.

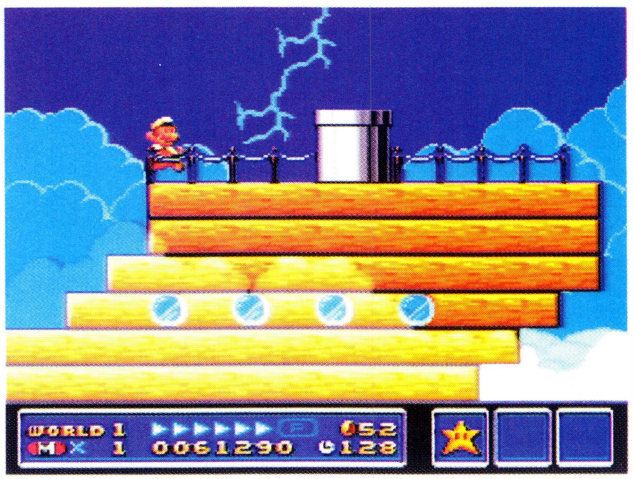
Four Mario games, including the terrific *Super Mario Bros 3*, and, for the first time outside Japan, you get *The Lost Levels*.

Super Mario Bros and *Super Mario Bros 3* show what all the fuss was about, and what made Nintendo the biggest console manufacturer in the world. Both are very simple and have a superb learning curve. *SMB* is challenging, but *SMB 3* is amazingly complicated too, more so than the SNES *Super Mario World*, and still more playable. Both games are great, even if the sluggish controls of *SMB* feel funny next to *SMB 3*.

The Lost Levels is *Super Mario Bros* in different clothes – same gameplay but harder. Perhaps too hard, as even the first levels are impossible.

Super Mario Bros 2 is a real oddity: it lacks the fluid gameplay of the others and the levels are badly designed.

In all, though, a great cartridge, worth buying just for the two classic *Mario* games. There's one bad thing about it: if the best cart around is a compilation of old eight-bit games, it doesn't say much for the standard of new games, does it?



Best of the bunch, *Mario 3* is a superb rendition of the eight-bit NES title (which, incidentally, is the best-selling game of all time)

***The Lost Levels* in all its weird, never-before-seen glory**

Mario takes to the air in the runt of the litter: *Super Mario 2*

Edge rating: **Eight/10**

Game: **Rainbow islands**
Format: **PC Engine CD**
Publisher: **NEC**
Price: **£60**

Shortly after the dawn of time, NEC Avenue announced they were to convert *Rainbow Islands* to the old CD-ROM 2 system.

Rainbow Islands on the PC Engine – one of the most delayed games of all time

What they forgot to mention was that it was going to take them about four years.

Even the sequel, *Parasol Stars*, managed to beat it, arriving on the Engine about two years ago. But to make amends, *Rainbow Islands* was always the stronger game of the series, (although ardent fans of the original *Bubble Bobble* might argue differently). Its playability and original gameplay features are still largely unmatched.

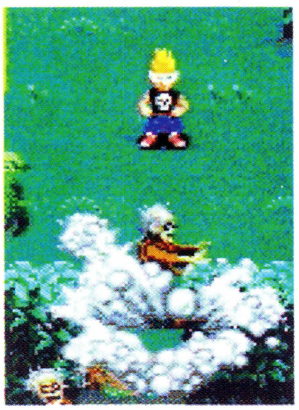
In many ways it's the definitive cutesy platform game. A Taito masterpiece. And on the Engine it's brilliant, with colourful graphics, flawless playability and even that terrible over-the-rainbow theme in 'glorious' Dolby Surround sound.

The only thing missing is the two-player option, oh – and things are spoilt a tad by some occasional slowdown. But apart from that, it's still the classic it always was. Well worth the wait. E

Edge rating: **Seven/10**

Game: **Zombies Ate My Neighbors**
Format: **SNES**
Publisher: **Konami**
Price: **£45**

Zombies Ate My Neighbors wins the prize for daft title of the year. In the game your job is to save a set amount of neighbours from the clutches of the living dead.



Throw an exploding can, and you scatter the zombie things here there and everywhere

Zombies starts off well with smoothly scrolling colourful backgrounds plus great animated sprites. And using your pocket radar, locating and saving the neighbours is fun.

The game is full of nice touches, like the ability to rush into a neighbour's house and search their cupboards for useful objects that can be used as weapons – beer cans double up as grenades, for example. The music suits the game and the whole product is in the style of a 50s B-movie.

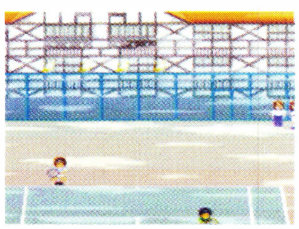
Even with two players, though, the action soon becomes boring, and your initial enthusiasm wanes fast. If there was more to it, *Zombies Ate My Neighbors* could have been great.

As it is, the different styled backgrounds and the addition of some end of level guardians does little to inject any life into what is basically a pretty dead game. E

Edge rating: **Six/10**

Game: **Super Family Tennis**
Format: **SNES**
Publisher: **Namco**
Price: **£45**

Super Family Tennis is the official sequel to *Family Tennis*, a game that originally appeared on the Japanese Famicom. While it's good, it (and any other tennis simulation on the SNES) has the unenviable task of competing with Tonkin House's *Super Tennis*. But *Super Family Tennis* does have one distinct advantage over the Tonkin classic – it allows a fourplayer game.



***Super Family Tennis* with one of the nicer of the five backdrops**

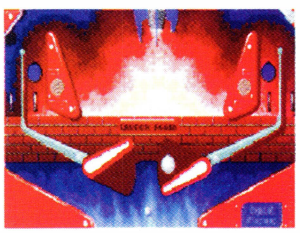
You get the normal tennis options, from the variety of players and courts, to the varying match lengths. But things quickly get weird: the courts are not your normal tennis courts: you can choose to play beside the seaside, complete with crashing waves – or you can have a game outside a far-eastern pagoda.

The game plays quite well in oneplayer mode, but the controls are not as intuitive as in *Super Tennis*. There's a distinct lack of shots, and the ability to pull off crosscourt passes is hampered by the dodgy control system. The game comes into its own when played with four players – the lack of shots doesn't detract from the fun to be had in multiplayer mode.

Super Family Tennis is a good, if not essential, purchase, especially for multiplayer fans. But Tonkin's *Super Tennis* is more playable and has added depth for one or two players. E

Edge rating: **Seven/10**

Game: **Pinball Dreams**
Format: **PC**
Publisher: **21st Century**
Price: **£38**



The first and best of the tables in *Pinball Dreams*, called Ignition

Pinball Dreams was an amazingly polished product on the Amiga, proving that this game could be the most addictive computer-translated tabletop game ever. And it was one that spawned an equally professional follow-up, in the form of *Pinball Fantasies*.

But the big attraction here, of course, is the game scrolling just as fast and impressively on the PC as the original did on the Amiga. It's completely smooth on a fast machine, but you do need a fast graphics card, too.

Spidersoft have done a great conversion here, especially with the ball movement – it's brilliant and at times frustratingly realistic.

For some reason, though, the screen detail isn't as impressive as it was on the Amiga, with some cross-hatch shading letting things down ever so slightly in places.

And the sound really grates through a Soundblaster Audio card. It's like a Nirvana demo played through a Force 9 gale as heard by a deaf person in a noisy room. In other words, the samples are terrible: noisy and scratchy, and barely audible at normal volume.

But still, it's an unmissable game, and one of the best videogame versions of the desktop game ever created. A version of the sequel, *Pinball Fantasies*, is due out by Christmas. E

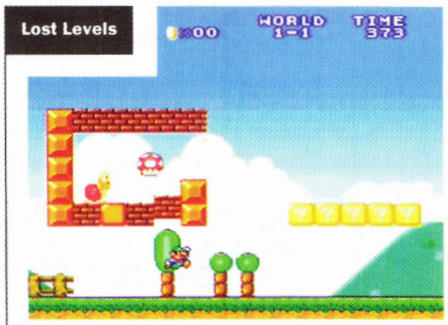
Edge rating: **Eight/10**

With its SNES console reaching maturity, Nintendo makes a clever move by repackaging some of its older hits as a collection – and hits don't come much bigger than the *Mario* series. This spread looks at the four parts in turn, with extended captions. (Note: is it correct to say that the NES used coin-op boards?) (Clue: no.)

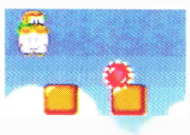
Format: **Super NES**
Publisher: **Nintendo**
Price: **£90 (Import)**

Super Mario

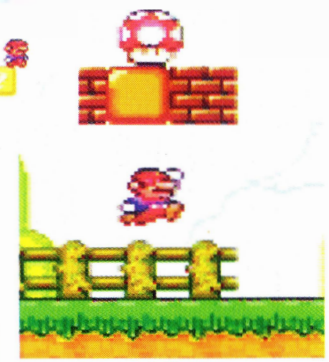
Nintendo surprised everyone by announcing, with the minimum of fuss, the Super Mario All-Stars Compilation for the Super NES. So far all the hype has come from magazines and gamers eager to get their hands this collection of old NES games, updated for the Super NES. Right now, it's only available on import (at prices upwards of £90!) and it doesn't work with some adaptors. But it will be available officially in the UK from October at £50 and there will be a new Super Mario All-Stars Super NES bundle costing £130 following soon after.



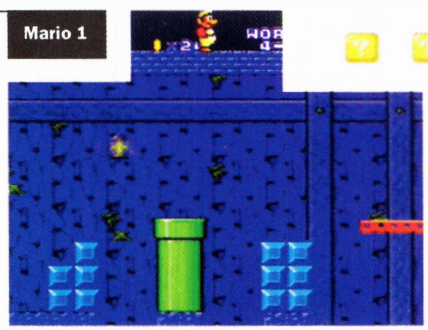
This was Super Mario Bros 2 in Japan. It was available on disk only for the Famicom, the Japanese NES. It's not that much of a sequel, more an extension of the original – it's the exact same game engine as Super Mario Bros with new levels. The graphics are pretty the same as the original but it's much harder

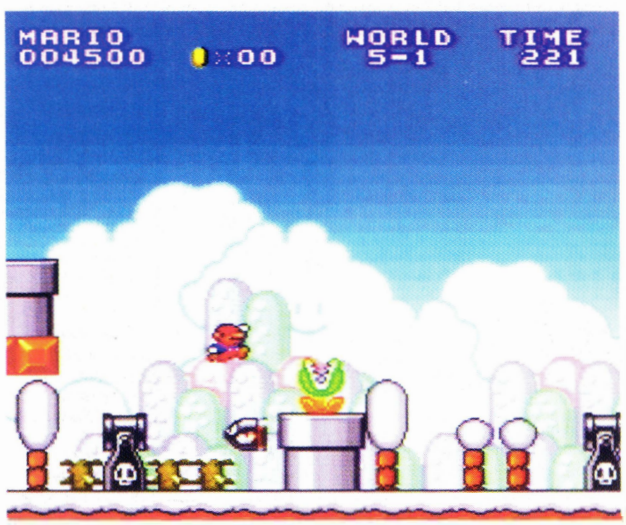


By jumping up and hitting blocks in platforms Mario can get coins and power-ups like the mushroom and the fireball flower



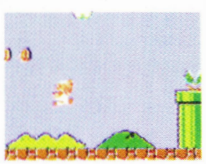
Mario can get onto the 'ceiling' of some levels to reach warp zones





The snowbound World 5 in Super Mario Bros. The snow makes Mario a little more tricky to control but the obstacles are the main problem

Originally an arcade game, the NES was launched with an arcade-perfect version of Super Mario Bros – not so difficult as the NES used the same boards as the arcade. The game took elements from the single screen Mario Bros platform game, like the block bashing and the power ups, and put them into an enormous scrolling game. There are eight different worlds, hidden warp zones to skip entire levels and the first showdown with King Koopa Bowser waiting at the end

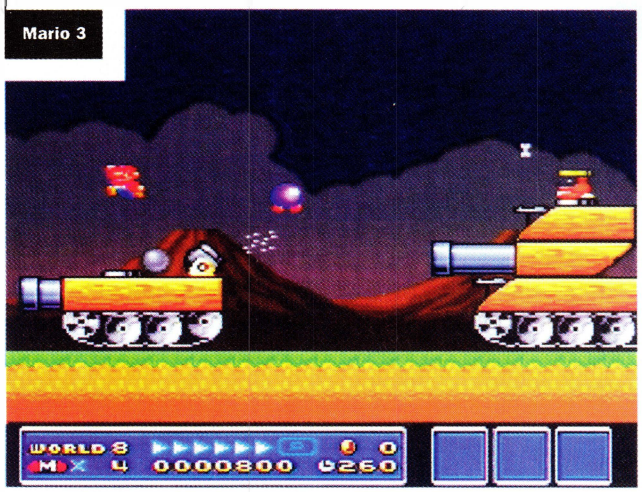


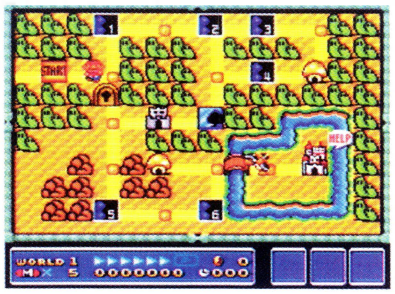
This is is the original NES Super Mario Bros – the Super NES version keeps every gameplay detail

Collection

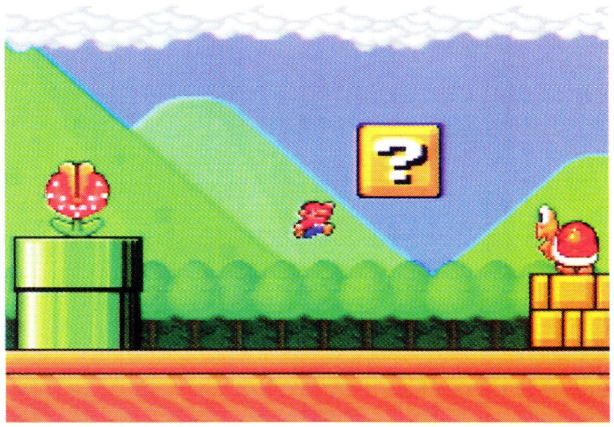
World 8 on Super Mario Bros 3 is very tough. On the first level Mario has to get avoid the tanks and their gunfire as they grind towards him

Mario 3



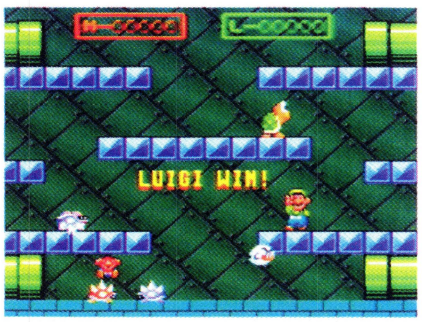


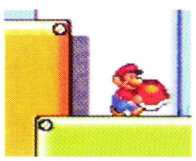
Each of the eight worlds in the game has its own map. You can choose your own route through it

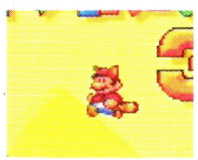


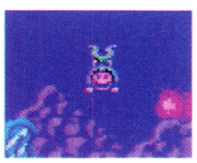
Super Mario Bros 3 was launched in 1990 and went on to become the best-selling NES cartridge of all time. SMB 3 expanded on the first Super Mario game in a number of ways: each world was presented on a map so that you could choose which levels you wanted to play; there were plenty more hidden warps and some very convoluted bonuses; a card game and a version of the ancient Mario Bros game hidden somewhere in it. Super Mario Bros 3 was huge, graphically varied and set new standards for console games when it first came out. This version has a save game facility, making it much more approachable

Super Mario Bros 3 can be played in two-player mode – if the two meet up on the same place on the map they get to play the original Mario game. The winner takes a life from the other player





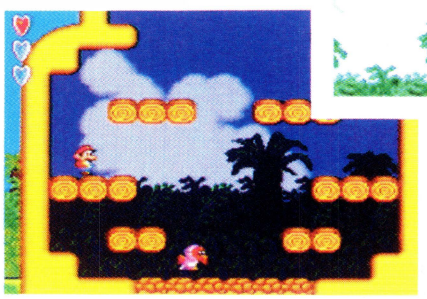


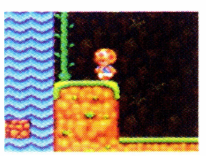


More power for Mario in SMB 3. He can pick up Koopa shells and throw them, and there are two suits – the frog suit and the flying Tanooki suit

Mario USA

No jumping on the heads in Mario 2 – try that and you'll die straight away. He has to pick up objects – pots and, it would appear, giant turnips – to throw at whatever attacks him.





Known as Mario 2 in the US and Europe, this was originally called *Doki Doki Panic* in Japan, and it's an arcade game set in mythical Arabia. The programmers changed the character sprites... and not much else. Gameplay's completely different to the other games – Mario has to uproot turnips and throw them at his enemies

Gunstar Heroes' vividly imaginative design makes it a perfect game for explaining in more detail with lots of juicy screenshots, although clearly the apparently Walt Disney-rousing animation is something you need to savour first-hand. Treasure's clearly in love with boss encounters...

Format: **Mega Drive**
Publisher: **Sega**
Developer: **Treasure**
Price: **£40**

Gunstar **Heroes**

Treasure's *Gunstar Heroes* looks and plays like Konami's *Super Probotector* on the SNES. No surprise – Treasure's programming team is largely made up of ex-Konami coders.

The athletic main character, the scrolling, the weapons, and the look of the bosses all give it that distinct *Super Probotector* feel. But this isn't a bad thing: *Super Probotector* was, and still is, a great shoot 'em up.

Each boss has been well animated – from the faceless mouth and eyes to the swirling dragon – a lot of time went into their design.

But it's lucky they're so well-animated – this game is packed with them. Just when you think you've finished a level, another boss appears, and then another, and another, and another... E

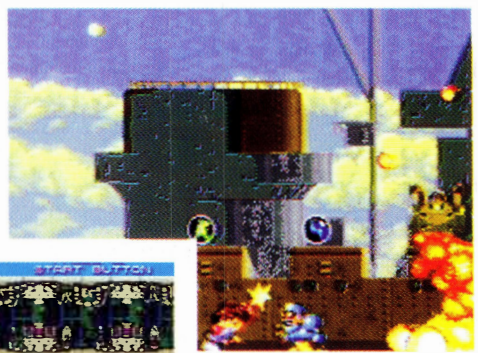
Level one

Level one begins, and our hero has already equipped himself with flame thrower. Brilliant for short range attacks, but otherwise useless

Still in the same level, you get obstacles such as these claws that must be avoided at all

Level two

The beginning of stage two requires you to chase the shuttle up the screen. You have to be pretty fast as it moves very quickly. Watch out for those large, sharp and entirely functionless propellers that loom at the top of the screen

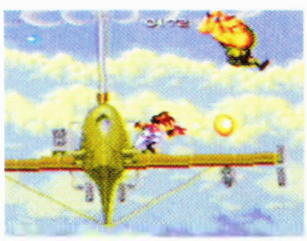


Two power-ups are available, the lightning fire and force fire. Combine them for best results

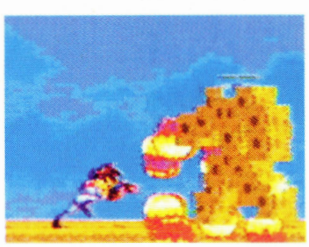
Decisions, decisions. After choosing weapons, you have the choice of which stage to tackle first. They all contain their fair share of baddies

Bosses

Gunstar Heroes contains many mid-level bosses. This fiery fellow is found in the dice palace



Someone should tell that guy that wing-walking is not the most sensible of pastimes



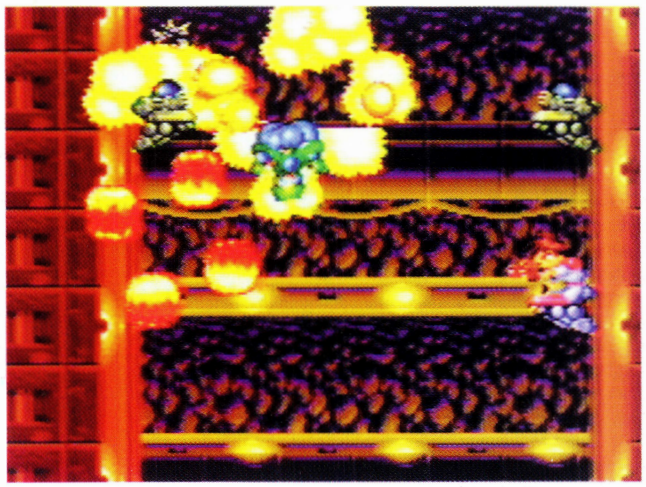
This boss may look great here, but wait till you see him. Even Walt Disney would be astonished...

The numbers in the middle of the screen display the boss's energy. His is a lot bigger than yours

Level three

Stage three is set underground. Using a mining cart you have to toggle between both the top and the bottom of the screen to ensure maximum success. This section moves along at a hectic pace

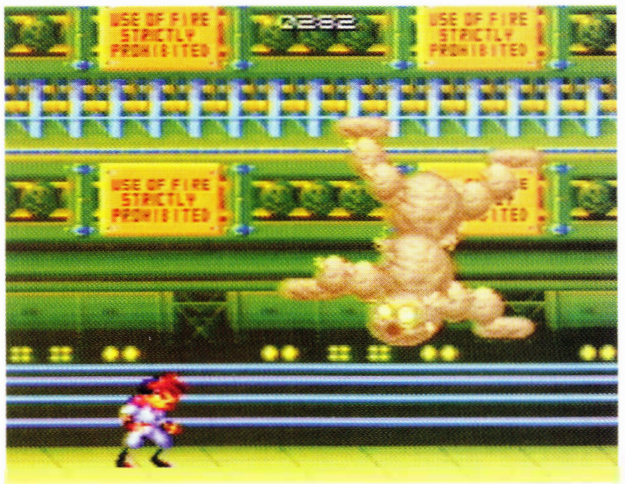
After the horizontal scrolling section you get the vertical one. Just as fast but you're left with very little room to manoeuvre. Again both sides of the screen must be used, especially when the bosses make an appearance



Level four

The end of the fourth stage. All your athletic abilities must be used in order to make it through

Throw the die to move around the board in the dice palace. Get to the end and face the last boss

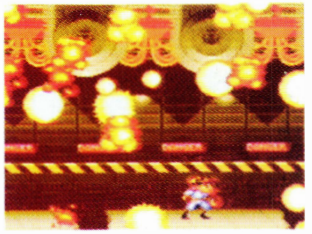


The dice palace requires you to take on some of the toughest bosses in the entire game. This boss uses round sprites, and they individually spin around. Here all your fighting skill is needed as the boss attempts an aerial attack. Looks like Michelin man in full flight...

Level two's boss attempts to catch up your speeding cart. For best results, use the top of the screen

Travelling down the mining shaft, you get very little room to move. Here's boss two to welcome you

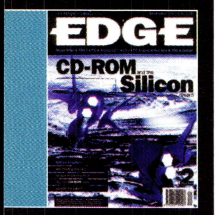
A new weapon has been created by combining two other weapons. So let the headless face have it



One of the ice palace bosses meets his match, and begins to blow up in pretty spectacular fashion

New **64bit** Jaguar from **Atari**, **page 6**... **Nintendo** signs up for **Silicon Graphics** deal for new home graphics workstations, **page 11**... **Philips CD-i** first with Digital Video cartridge, **page 14**... News from the **JAMMA** arcade show, **page 16**... Full **ECTS** report, **page 20**...

The very latest **news** from across the entire world of videogaming



Atari's Jaguar unveiling reveals the company to be focused on beating 3DO's new console when perhaps it should be thinking about what is going to come out of Japan. Similarly, 3DO's Trip Hawkins is guilty himself of making Atari's 64bit threat any kind of priority. Still, a 16-million colour palette...

Atari springs Jaguar on unsuspecting world

The next round of the technology wars has started. Commodore's Amiga CD32 is already onsale, the 3DO has upped the stakes for speed and power and now Atari are going for broke with a 64bit, 16 million colour console...

Faster than a speeding... well, Jaguar, Atari introduced hardware prototypes of its upcoming super-console and showed in-progress software to a gathering of the press on August 18th at its Sunnyvale, California offices. The press conference that **Edge** attended was headed up by Atari president **Sam Tramiel** and formally threw the gauntlet back in the face of Trip Hawkins and his 3DO.

In fact, the Jaguar press kit started off by quoting Hawkins' own introduction of 3DO: 'You have to provide a performance level that puts the stake way out there... then people don't bother to challenge it.' Atari's press release went on to say that the Jaguar's specs – which include over 16 million colours and animation exceeding 850 million pixels per second, compared to 3DO's reported 64 million – 'puts the stake way out there.' And, no surprises here either, Atari are keen to 'establish Jaguar as the industry standard for interactive multimedia performance.'

Trip Hawkins of 3DO has his own opinion of this. 'Our competitors are just forming their alliances and making announcements. 3DO was at this stage more than two years ago. We're delighted that they're taking our launch so seriously, and they think our coat-tails are the ones that will provide the best ride.'

There were

announcements that caught many reporters' attention prior to Atari's press conference, and gave some credence to the Jaguar's chances in what many would call a clogged marketplace. On July 2nd, Atari claimed that it had signed a $500 million deal with IBM, in →

Can Atari really produce their 64bit Jaguar console for just $200 retail? And why have they stuck with cartridges?

Hawkins hawks 3DO

Making the opening speech at the annual Sigraph computer graphics show in Anaheim, California, ten days before the launch of the Jaguar, Trip Hawkins of 3DO sounded like he was already on the defensive. He pointed out that when radio was introduced to the US, in one year 35 per cent of furniture sold in the States was radios and that, if you translate the price from those days into modern terms, each radio cost the equivalent of $1,600.

All the same, his system with its $700 pricetag begins to look a little overpriced next to a Jaguar with CD-ROM at around $400...

Anatomy of a predator

So what's the Jaguar got inside it then? Read on...

- **64bit RISC-based processing architecture**
- **106 Megabytes per second 64bit data path**
- **27 million instructions per second (MIPS) Graphics Processor with 4Kbytes of zero wait-state internal SRAM**
- **Programmable processor/sprite engine**
- **27 MIPS Digital Signal Processor (DSP) with 8Kbytes of zero wait-state internal SRAM**
- **High-speed Blitter GFX chip with hardware support for Z-buffering and Gouraud shading**
- **Motorola MC68000 CPU running at 13.3 MHz**
- **32-bit graphics giving 16.7 million colours**
- **Enhanced JPEG-assisted ROM compression for up to 400Megabits of data per cartridge**
- **16 Megabits of fast page-mode DRAM**
- **Optional double-speed CD-ROM drive 350K/sec**
- **CinePak software video decompression**
- **Com/Lynx I/O for networked games**
- **Two (expandable to dozens) control ports, supporting digital and analog interfaces, as well as keyboards, lightguns and mice**
- **Joypad with three fire buttons and 12-key keypad for game-specific overlays**
- **High-speed serial port for modem, cable TV and network connections**

Sam Tramiel, President of Atari Corporation, at the US press launch of the Jaguar, which was held at Atari's spacious Sunnyvale, California headquarters (right)

← which IBM would manufacture the Jaguar in its Charlotte, North Carolina, plant, taking some weight off Atari for producing and maintaining quality of the product.

Another statement in early July found Atari and the world's largest media and entertainment company, Time Warner, joining forces to offer Time Warner's extensive video library to Atari and thirdparty developers for use in Jaguar products. It's interesting to note that Time Warner is also one of the strategic partners in 3DO, offering the latter firm similar access to its properties.

'We've been waiting for our 'Betamax' to emerge, and now perhaps it is,' Hawkins added, referring to the technically superior video recorder system that somehow failed to become the established standard. 'But 3DO has what it takes to be the VHS of the interactive market.'

'The imagery just has to be seen to be believed. But wait until you see how you can interact with these images'

Sam Tramiel
President, Atari Corp.

Jaguar will be introduced to limited areas – San Francisco and New York – beginning in October at a price of $200, with rollout to the rest of the US starting in January 1994. Expectations are for the system to be available nationwide by the second quarter of 1994.

A double-speed CD-ROM drive, which looks distressingly like a toilet when on top of the Jaguar, will also be priced at about $200 and introduced in early 1994. It has a capacity of roughly 700Mb and also plays audio and karaoke CDs, CD+G discs and Kodak Photo CDs. Adding an optional MPEG 2 (Motion Picture Expert Group) cartridge will permit viewing of full-length movies played from CD. So far, so good.

But if any aspect of the hardware did seem badly designed on examination at the launch, it was Jaguar's control pad. Having a 12-key keypad is a great idea, certainly, but limiting the use of the joypad itself to three main buttons is ludicrous. What about games like *Street Fighter II* that use six buttons? Or *Smash TV*-style directional fire as on the SNES? Even 3DO has two SNES-style top buttons.

This niggle aside, the spec sheet is impressive: twice as powerful as 3DO, →

What is it?

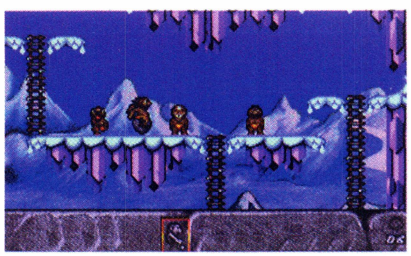
Designed by a Cambridge-based trio called Flare Technology back in 1989, and co-designed by a well known joystick firm, this console incorporated RISC-based technology and a 3.5in disk drive and was due to cost around £200...

Chips down in chemical factory explosion

On the 6th August the Sumitomo Chemicals plant in Tokyo, Japan, exploded. Which wouldn't matter, except that it supplies 60 percent of the epoxy resin used in RAM chips worldwide: Hitachi and Toshiba are expected to run out by October if a fresh supply isn't traced. And the world price for DRAM is now higher than ever. Something that many thought would affect 3DO's and Jaguar's launch prices.

Continued next page

So, you've got your Jaguar. And what do you get to play on it? *Humans*. Not a good start



But then, it's not a bad little game really. And it'll certainly be fast. Blimey, can't wait

Now, we'd hate to suggest *Kasumi Ninja* reminds us of anything. But it does

Bob Brodie, Atari's Director of Communications (left), and Juli Wade of Atari (right) holding the fashionably toilet-like CD-ROM drive on top of a Jaguar console

it is...

The Konix console... from Wales.
Touted as the UK's answer to the emerging presence of the Japanese consoles, this powerful (at the time) but flawed concept machine failed to appear, leaving Konix with big debts.

3DO Japan helps developers

The Japanese wing of the console-creating US firm is offering software developers a free library of 200 CD-ROM discs full of software tools and audio-visual data.
The idea is to speed up the development process and lower the cost, so that more developers are willing to get involved, as well as to ensure that programming guidelines are followed, thus ensuring quality.
3DO Japan also have an online support network and a fax-based information service.

Continued

← according to Atari.

As **Edge** one reported, Atari used its Cambridge facility to design the chips that power the system. Two custom chips, Tom and Jerry (Atari always had a flair for naming chips) contain four of the five processors in the Jaguar; a 68000 is also on board for varied purposes. **John Skrutch**, Atari's director of software development in the States, told **Edge** that you could take one of the Jaguar's processors, say the sound processor, and turn it loose for another task, such as graphics calculations.

The power of the of the Jaguar in creating software is immediately apparent. Atari claims the system is built for special effects such as morphing, warping, texture mapping, transparency and multiple lighting sources. The same kind of effects that 3DO is claiming their system can do, in fact.

'We're delighted that they think our coat tails are the ones that will provide the best ride'

Trip Hawkins, President, 3DO Company

However, it has to be said, much of the software on display at the launch looked pretty dodgy in the early stages. Here's the opening slate of software releases that Atari has in the works:

Trevor McFur in Crescent Galaxy – A 'shooter' with an original title, this one features simultaneous twoplayer action with some impressive 3D rendered (but tacky-looking) parallax scrolling graphics. There are nine levels featuring five different worlds and there's definitely some evidence of lots of colours in there. Unlike...

Raiden – Yes, it's that old vertically scrolling coin-op that's appeared on the Super NES (an appalling conversion), Mega Drive (pretty good), the PC Engine (even better) and on the PC Engine Super CD ROM^2 (virtually coin-op perfect). So why are they bothering to port it to the Jaguar? The words straws and clutching immediately spring to mind.

Cybermorph – In a rather similar vein to *Starfox*, you have to fly over the terrain and blast anything that comes into your path. However, John Skrutch told **Edge** the difference between the two games is that *Cybermorph* takes the plane 'off the rails,' allowing the pilot to fly anywhere, rendering →

VideoCD standard set

Electronics megacorps Matsushita (Panasonic), Philips, Sony and JVC have agreed on a standard VideoCD logo which will appear on all products that use the new digital video system. This is the same idea as the CD logo we all became familiar with on hifi CDs and is meant to reassure customers that they are buying a standard product that will work on their machines.

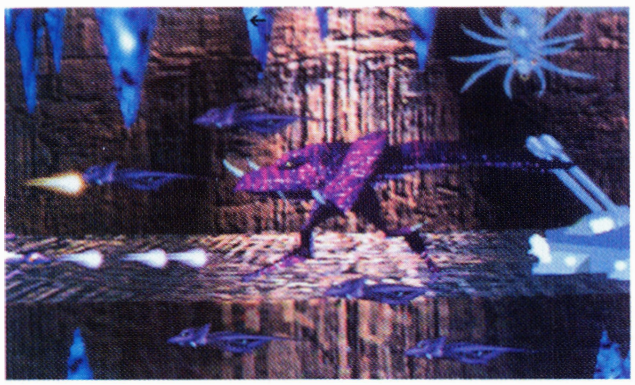
The standard has only been known up to now as MPEG 1 full-motion video (FMV), and is set to appear in 3DO, Commodore's Amiga CD^{32}, Philips' CD-i (see page 14) and Atari's Jaguar (see page 6). All these machines will probably carry the VideoCD logo eventually, though for most of them VideoCD will come as a £200 addon to the standard system.

Videos on CD have obvious appeal, but the technical problem is that when you try to put 50 frames of video data on screen every second, the CD-ROM drives cannot shift data quickly enough. The MPEG 1 standard is a set of chips which compress the data on the CD and decompress it for the TV to display. Its use means that 74 minutes of video with stereo sound can fit on a normal 12cm (5-inch) CD.

Now this looks more like it, doesn't it? *Crescent Galaxy* – an attractive shoot 'em up

***Raiden* – apparently, the Jaguar version will be the closest conversion yet seen...**

Why then, is there a big brown ST-style panel on the right side of the screen? How strange



***Crescent Galaxy*, one of the better-looking Jaguar games from this initial batch, features side-on scrolling rendered parallax graphics**

3DO online for October

Already, 317 developers have signed up to create software for 3DO, though only a handful is likely to be actually onsale on the projected launch date.

'We expect at least eight titles to be available in October,' says Panasonic's Richard Lovisolo, 'with many more becoming available throughout the remainder of the year.'

One title that will definitely be finished, however, is Crystal Dynamics' *Crash and Burn*, (see Edge One) which will be bundled with the Panasonic REAL 3DO machine when it goes onsale. 'The first Panasonic multiplayers will be delivered to dealers in late September and will be available to consumers on October 4th', Lovisolo promises.

← the landscape on the fly. The 3D update is exceptionally smooth in this title.

Club Drive – A driving game based around a 21st Century theme park where all the cars are indestructible and the terrain is uncompromisingly rough. Different levels are represented by detailed 3D polygon environments such as a futuristic city, a Wild West town and even a scaled-down toy car world where you race around your living room dodging furniture.

Checkered Flag II – A Formula One racing game also using 3D polygons. This promises lots of speed, and all of the cars, buildings and roads are rendered in true 3D with lots of options, such as to customise your car.

Tiny Toon Adventures – Nothing to do with the Konami game on the SNES and Mega Drive (and nowhere near as pretty either), this features some side-on platform action.

Aliens vs Predator – Bringing together two of 20th Century Fox's movie bad guys, this game's graphics were demonstrated as evidence of the Jaguar's power. The player navigates through texture-mapped, scaling hallways in smooth 3D perspective.

Kasumi Ninja – Well, they had to have an *SFII* clone in here somewhere, and in a description that smacks of exactly that, Atari claims that warriors can pick from '91 different martial arts movements'.

On release this month

22 Mega Drive games reviewed in: MEGA

Highest rated: **Street Fighter II** 92%
Lowest rated: **Bart's Nightmare** 35%

24 PC games reviewed in: PC FORMAT

Highest rated: **NHL Hockey** 80%
Lowest rated: **Pinball for Windows** 39%

20 SNES games reviewed in: INDEPENDENT SUPER NINTENDO MAGAZINE SUPER PLAY

Highest rated: **Jurassic Park** 89%
Lowest rated: **Arcus Odyssey** 52%

32 Amiga games reviewed in: AMIGA POWER

Highest rated: **Micro Machines** 88%
Lowest rated: **Napoleonics** 22%

Tempest 2000 – Need we say any more? In a recreation of the wire frame arcade game from a zillion years back, the Jaguar version is identical. That is, apart from a starfield background and another 50 levels.

Evolution Dino Dudes – Things are getting desperate. This one is actually Mirage's *Humans* retitled and revamped. At this stage there seems little evidence of all those extra colours, despite Atari claims of 'vivid colours and creative use of animation facilities.'

Though Atari

announced a lot of interest from third party developers, it held off comment until the middle of September on exactly what licences it had signed. It's natural for there to be interest in the Jaguar from software developers because of its low cost. No doubt, with the amount of →

BUZZ words

Multimedia

' It's like amazing what **multimedia** will mean it's like a new form of videogame and music and cinema all rolled into one it's like going to a movie with your walkman on and shouting all the way through the film yeah it'll all be on CD you just bung it in the drive and interact with it yeah totally crucial... **'**

Continued next page

Hey, more sexy *Raiden* shots. How does the Jaguar handle all those shades of brown?

***Tiny Toon Adventures* has a few more colours though. Things are improving. A bit.**

You never know, this might as good as the Konami games. But then again, it might not

head to head

'We believe that we have taken a more substantial jump than 3DO has in bringing a better and more affordable entertainment experience to the consumer market'

Sam Tramiel, President, Atari Corporation

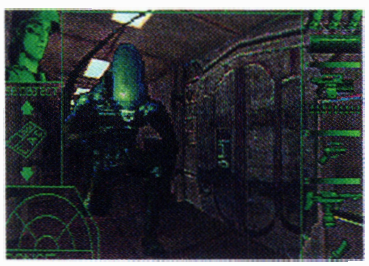
'Our competitors are just forming their alliances and making announcements. 3DO was at that stage more than two years ago. We're delighted they are taking our launch so seriously'

Trip Hawkins, President and CEO, The 3DO Company

Talk back

'I would be hard pressed to name a single decent CD game. I wouldn't say the first batch of CD games have been disappointing. I'd say they've been shite.' **Peter Molyneux, MD of Bullfrog, speaking frankly about CD-ROM gaming. (Full Edge report on page 48).**

'The multimedia interactive consumer is going to want lots of interactivity. Lots of digitised Stallone and Schwarzenegger. He might buy a £9.99 Playboy disc as a bit of light relief, but that's all' **Tim Chaney, MD of Virgin Games, on the future of CD porn (full feature, page 62).**



One of the better Jaguar games – *Aliens Vs Predator* – with smooth 3D graphics

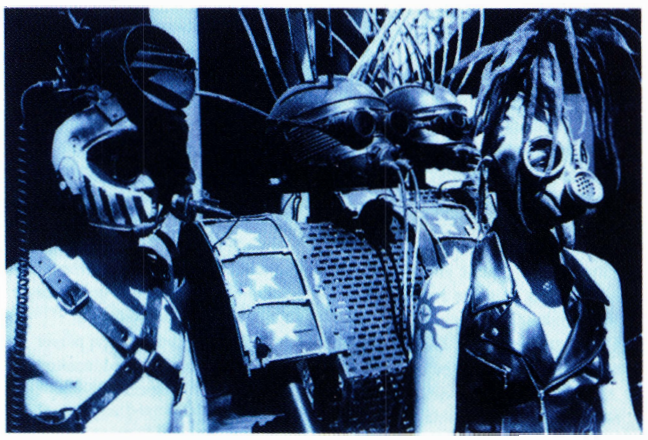
← time it will take to create the new generation of games for 3DO, CD-i and the PC, the Jaguar will provide another platform for spreading out development costs.

Additionally, the Jaguar development system is very inexpensive: about $9,000 compared with the 3DO's $30,000. The development system consists of an Atari TT personal computer with custom tools, but Atari has dropped its long-time 'Atari-only' policy, so there's a PC-based development station available as well, and there is a lot of development using Mac-based tools.

Atari plans to introduce Jaguar into the UK next spring. Could the cynics be right in saying it will follow Lynx and Falcon on the endangered species list? Stay with **Edge** for more news...

Cyberpeople gather in London

The Cyberseed event taking place in London on October 8th and 9th is set to be a pretty strange affair. It's basically a festival of fun for all things cyberpunk based around audiovisual experiences, and will include state-of-the-art virtual reality systems, computer graphics, film special effects, electronic gaming systems, comics, robots, cyber-fashion, street art and computer art, and all kinds of other things. All in all, multimedia gone mad with lots of great music and visuals, plus loads of people wearing silly clothes. Get yourself down to to Bagley's Studio, York Way, King's Cross, London N1 on the dates above to take part.



Attract mode

This is a regular spot for Edge to show off the best ingame intros around. The brilliant LucasArts PC game, *Day Of The Tentacle*, is a weird and wacky RPG adventure, laden with surreal humour, and with more than a touch of the American B-movie. The intro introduces the hero, Bernard (nickname: B-Man), and his mission – to save the world from the evil Purple Tentacle...

1 (Scene 1) An idyllic country scene in small-town America. Here a bird slowly flies across the screen and grins at the player. The graphics are big, chunky and styled to give a Hanna Barbera/Flintstones, cartoony feel to the action

2 (Scene 2) The cartoon bird suddenly chokes and falls from the sky as we approach the poisonous stream outside the Edison's Motel. Now the two tentacles arrive, squelchily. Purple Tentacle moves up to the river to take a drink of the foul water...

3 (Scene 3) Purple Tentacle drinks the toxic water. 'It makes me feel more powerful, more aggressive...' he boasts, but starts convulsing strangely. When he revives he has sprouted small stumpy arms. 'I feel I could take on the world...', he declares

Nintendo super-machine for 1995?

The Silicon Graphics Indy – 100MHz R4000 processor, 16Mb RAM, and on the road for only £4,350. A scaled-down SGI/Nintendo games machine is planned

You may not be that familiar with Silicon Graphics Inc (SGI), but you surely know its impact on modern entertainment. The high-end computer and graphics company has done special effects for *Terminator 2* and *Jurassic Park*, among its many movie and TV credits.

It also recently released a RISC-based desktop workstation called Indy that reportedly can emulate an Apple Mac or a PC, as well as featuring its own desktop environment called Indigo Magic – a media-rich point-and-click interface destined to enhance the development of home entertainment software.

Now, imagine for a minute that this kind of graphic power was available in your arcade or living room for games.

That was exactly what was announced at the joint press conference between Nintendo and Silicon Graphics that **Edge** attended in San Francisco on 23rd August. 'Project Reality', as Nintendo is calling it, will result in arcade products in 1994 and a home-based machine in 1995 (retailing at a suggested price of $250).

'Together, Silicon Graphics and Nintendo make a dramatic step forward', said **James Clark**, SGI's chairman.

On the face of things, Nintendo's move is typically, well, Nintendo. Its previous announcements of joint projects with Philips and Sony were, in hindsight, little more than bold promises that failed to bear fruit. And with Saturn, 3DO and Jaguar all jostling for position it was only a matter of time before the big 'N' entered the race.

But supposing this set of promises does result in something. What exactly will Silicon Graphics provide for Nintendo? MIPS technology, that's what.

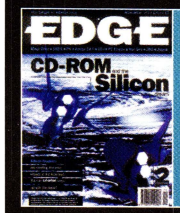
MIPS Technologies is a chip designer and manufacturer that was bought by SGI last year, and it will provide a version of its Multimedia Engine amounting to a 64-bit RISC microprocessor, graphics co-processor chip and Application Specific Integrated Circuits (ASICs) for specialised audio, video →

Continued next page

Who is it?

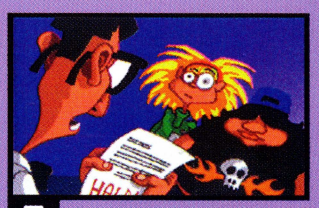
This person started out as a systems engineer and then realised he could make more money writing games. And not just any old tat, either. He's created some of the most engrossing and brilliantly designed 3D games ever...

***Jurassic Park*'s dinosaurs relied on Silicon Graphics hardware to bring them to life – now imagine these special effects on a Nintendo home system**

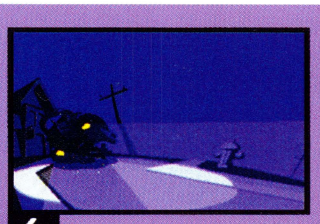


Making use of 'Reality Immersion Technology', Nintendo promises to "skip a generation" with what would become its N64. Meanwhile, Trip Hawkins is on the money with his proclamation that the "evil" Nintendo is in no position to compete in the "new multimedia market". Not that it even plans to, of course.

4 **(Scene 4) Meet Bernard's friends, Hoagy and Laverne. In this scene they open the door to find a small hamster clutching a note. Hoagy, a drummer in a heavy metal band, suggests biting off its head in tribute to Ozzy Osborne. Laverne suggests a dissection...**

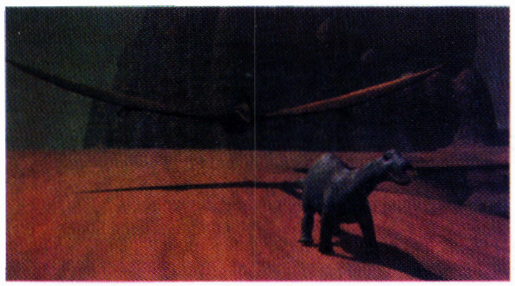


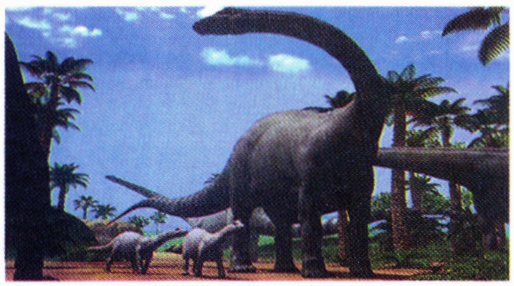
5 **(Scene 5) The eminently practical Bernard arrives and recognises the hamster. It belongs to 'Weird Ed' Edison up at the Motel, he says. He reads the note – it is from Green Tentacle who complains that he and Purple have been tied up by Doctor Ed**



6 **(Scene 6) Bernard seems reluctant to head off for the Motel – he has had dealings with the Edisons before – but we don't learn more about this 'til much later. The kids finally get in Bernard's car and head for the Motel. They crash when they arrive**

7 **(Scene 7) The end of the intro leads straight into the game. Here the kids decide to search 'commando-style' and Hoagy heads off upstairs and Laverne goes into the hall. Bernard is left alone in the lobby. Within seconds they are lost. Game on...**





A selection of shots from the *Pterodactyl Flight* ride – one of the interactive simulations on display at Sigraph '93. Three people could sit on top of giant plastic Pterodactyls in front of enormous screens

it is...

Geoff Crammond, programmer of classics like *Revs*, *The Sentinel*, *Stunt Car Racer* and Microprose's superlative driving sim, *F1 Grand Prix*. Geoff's next secret project is being written for the PC and features more racing cars...

Continued

Cable going crazy

The limitless uses for a digital system like a computer or games console tied in with a cable TV network are causing a degree of panic in a wide range of US entertainment, technology and telecommunications firms.

Bill Gates of Microsoft (who created the Windows operating system for the PC) recently expressed his amazement at 'the feeding frenzy or the gold rush' that is currently going on in these industries.

Firms are afraid of missing out if they don't jump on the bandwagon now. Already, a system has been put on trial in the States which uses the MPEG video compression standard to offer viewers a choice of movies from a list of hundreds.

See Edge's feature on page 70 for the latest on interactive network gaming.

← and graphics. Or 'Reality Immersion Technology' as both parties are calling it.

When quizzed by **Edge** about the announcement, **Dave Corbin**, director of marketing for MIPS, commented, 'SGI is a world leader in graphics. The ability to provide games that really are a step beyond, SGI is the best place to make that step. The other companies have to develop *upwards*, while SGI already has this technology on high power computers and just has to evolve that into a lower cost package. Nintendo clearly has the straight manufacturing capability for that kind of graphics product at that price.'

But with a clock speed in excess of 100 MHz and with 24bit colour super-high resolution images, Project Reality sounds unrealistic in the light of the $250 potential price figure Nintendo has mentioned.

After all, the new Silicon Graphics Indy workstation (see picture), which delivers this level of specs, costs in excess of £4,000.

Corbin notes, 'the arcade system will be a repackaging of workstation technology in a cabinet. The home system will be similar – it'll have the same roots, but it almost certainly won't be as powerful because of the lower price.'

However, what hasn't been revealed at this stage is the path Nintendo will take towards finding a suitable means of data storage for the system. The inefficiency of CD-ROM is often levelled as one of the biggest factors that has kept Nintendo out of the technology race so far.

Howard Lincoln, Nintendo of America's senior vice president, enthuses on the more concrete details of the new announcement. 'Nintendo's Project Reality dissolves the current limits of video play, causing the world to challenge what its notion of a videogame can be. Our work with Silicon Graphics enables us to actually skip a generation by driving straight through to true 64bit, 3D video entertainment.'

But you can't drive straight through to 64bit when someone's already beaten you to it. In this case, Atari who will be the first company to deliver 64bit technology for the home user when its Jaguar system debuts this October in parts of the US.

Silicon Graphics' extra power allows complex textures and shading to be rendered at very high resolutions

And bits aside, what about the impending might of 3DO? **Trip Hawkins**, president and CEO of 3DO, has his own opinion: 'Nintendo made their bed and now they'll have to lie in it. They have proven to be a great toy company but they are way out of position to compete in the new multimedia market.

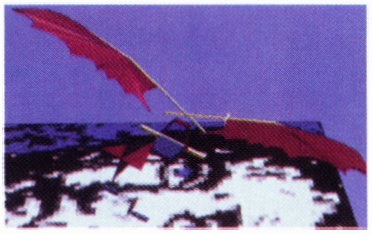
'Even if they turn up the heat on technology', he notes, 'Nintendo isn't going to change its licensing practices overnight. They are still the evil monopolist and we are the fair new wave.'

But 3DO is still evidently not quite fair enough to prevent $4·50 being instantly wiped off its share price when the news of Nintendo's Project Reality escaped...

Two weeks before Project Reality was announced, the 20th annual Sigraph Conference – a major exhibition for advanced computer graphics – took place in Anaheim, California. Naturally, **Edge** attended.

The 28,000 people who also made it to the show were a good indication of the current fascination with computer graphics.

Sigraph stands for the 'special interest group on computer graphics and interactive techniques', and the theme of the 1993 conference was 'The Eye of Technology', →



***The Labyrinth* – a bizarre journey through space in control of Daedalus – one of the exhibits from Sigraph '93**

Data stream

Maximum no. of colours displayed by Amiga CD32: **262,000**

Maximum no. of colours displayed by Atari Jaguar: **16,777,216**

Price of Team 17's *Alien Breed* on CD32 disc: **£14**

Price of Sega's *Night Trap* on Mega CD disc: **£50**

Copies of *Sonic 2* 'shipped' to UK shops on launch day of *Sonic* Tuesday: **1 million**

Copies of Acclaim's *Mortal Kombat* 'shipped' to shops on Mortal Monday: **500,000**

Worldwide sales of Michael Jackson's BAD album: **14 million** [1]

Worldwide sales of Nintendo's *Super Mario Bros 3*: **15 million** [2]

Worldwide sales of Commodore's C64 8bit computer: **13 million** [3]

Proportion of 5-11 year olds who list gaming as favourite hobby at home in 1993: **37%** [4]

Proportion of 5-11 year olds who list reading as favourite hobby at home in 1993: **32%** [4]

Proportion of 5-11 year olds who listed reading as favourite hobby at home in 1933: **52%** [4]

Size of the UK video games retail market at the end of 1992 has been estimated at between: **£700 million to £900 million**

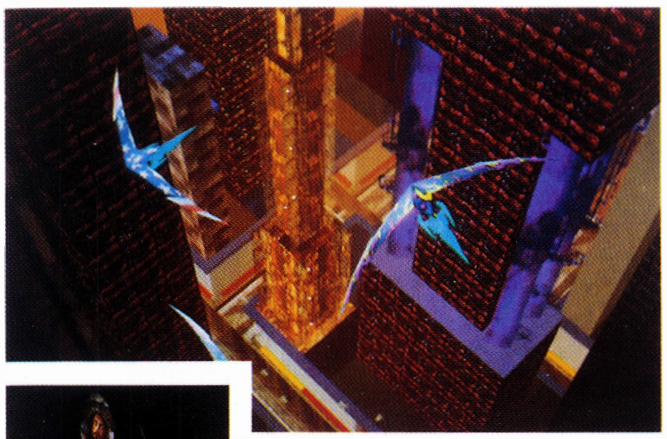
Compare this to figures for chewing gum: **£200 million**, cinema visits: **£300 million**, batteries: **£395 million**, snacks: **£573 million**, video rental **£600 million**, and video sell-through at **£200 million.**

Worldwide turnover of Electronic Arts in 1992: **$300 million** [6]

Number of magazines sold by **Edge's** publisher Future Leisure in a month: **850,000+** [7]

Copies of **Edge** Two printed: **46,070** [8]

Sources [1] A&M Records [2] Nintendo [3] Commodore [4] Bird's Eye Youth Trends Survey 1993 [5] Steve Carey in *CTW* 06 9 93 [6] *CTW* 06 9 93 [7] Greg Ingham [8] A nice young lady in production



***Hang-glider Flight* (top) – an amazing real time virtual reality flight sim from Evans and Sutherland. And (above) VR computerised confessionals**

Nintendo in planes and hotels

You must, surely, have seen a mention of the Nintendo Gateway system by now. It's a new system they've flogged to all the airline and hotel companies. It offers old SNES games, onscreen shopping and a choice of movie or music.

And, according to the scenario sketched up by the press release, what a nice world it will bring. Follow our hero Dan as he tests it. 'Dan had heard enough from [his son] Cam about how cool the Nintendo game *Pilot Wings* was. Dan figured 90 minutes of practice here in his seat would allow him to sit down when he got home, take control of his R Wing fighter on the livingroom screen, and impress his son with the fact that the old man wasn't over the hill yet.' Barf.

← providing attendees with the opportunity to experience state-of-the-art advances in graphics, multimedia and interactive work...

The conference opened with an address by **James Cameron**, director of *Aliens*, *The Abyss*, and *Terminator 2* – and also co-owner of Digital Domain, a full-range special effects house that includes both computer imaging and traditional animatronics.

Digital Domain is currently at work on a huge Terminator 2 multimedia attraction for the Universal Studios Tour, as well as the effects work for films like Cameron's new Schwarzenegger comedy adventure, *True Lies*, and Neil Jordan's upcoming film, *Interview with a Vampire*. Cameron mostly spoke of a new relationship that must be established between film directors and special effects.

After the speech, in the three main exhibit halls exhibitors demonstrated their latest products. It seemed that almost everyone had new morphing and special effects software programs for Silicon Graphics workstations.

Of particular interest to **Edge** were the virtual reality exhibits produced by special effects software house Evans and Sutherland.

Pterodactyl Flight and Hang-glider Flight were very impressive and exciting enough to keep three thousand eager participants queuing for over forty-five minutes. The object? To lie in a sling with your rear in the air and your head in a box, to experience a five-minute sensation of gliding through canyons and a towering metropolis. What was it like? Let's just say the forty-five minute wait was well worth it.

The buzzword

for Sigraph '93 was 'desktop', and there were several new platforms unveiled that allow a single person to produce high quantity animations.

In one finished module, called *Labyrinth*, by Fred Truck and Electric Bank, a participant could navigate an ornithopter through a 3D slice of a 4th dimensional manifold using a DataGlove and a head-mounted display.

Next year, Sigraph will include a **VRoom** where new trends in virtual reality will be shown. But you'll have to make your way to Florida for all that – Sigraph '94 will hit Orlando in the last week of July.

Bad press

Only the small-minded are slaves to consistency, so this time Edge looks at what people are saying about gaming and health...

Sega game could cause eye damage

Virtual Reality seems to be the subject of particular concern for anti-game technology Luddites, with this piece by Steve Connor and Susan Watts in the **Independent on Sunday** leading the field.

"A new toy that allows children to play computer video games in 'virtual reality' could permanently damage their eyesight.

"Mark Mon-Williams, an optometrist, said that people who used the headsets for ten minutes showed similar visual disturbances to those who spend eight hours at a computer screen. "It's amazing what you are asking your eyes to do inside the headset," he said.

"Of 20 young adults who took part in a 10-minute test, 12 experienced side-effects such as headaches, nausea and blurred vision. Mr Mon-Williams said that a particular concern is that the headset puts a lot of strain on binocular vision, which is fully developed in adults but is more liable to break down under stress in children under 12 years, causing squints."

Indeed, any **Edge**person who has tried it might already be aware that VR can cause unpleasant feelings, as the IoS goes on to report: "A form of travel sickness is affecting people who spend too long in a virtual environment. Symptoms such as nausea and disorientation are brought on by the slight time-lag between people moving their head and the scene they are immersed in 'catching up.'"

source: Independent on Sunday 05/9/93

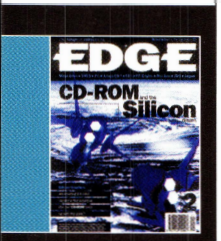
Parents given warnings

An intelligent and balanced leaflet has just been produced by the National Council for Educational Technology to advise parents about the possible effect of videogames on their kids' health.

"There are some good things about video games," the leaflet begins. "Children learn to think and act more quickly; they will concentrate for longer and develop their attention span; they learn from their experience, changing the way they play in order to win or get a better score."

The leaflet does go on, though, to warn of problems with violent or sexist games, kids who play too much and photosensitive epilepsy. Copies can be obtained from the address below.

source: NCET, 3 Devonshire Street, LONDON W1N 2BA



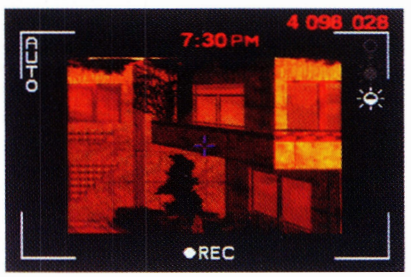
It may use familiar interactive movie mechanics, but here Philips' CD-i is serving up a heady mix of political content and women slinking around in their underwear, paving the way for a complex interactive future capable of exploring adult themes that amount to much more than killing, gore and bad language.

Voyeur

Enter the age of the interactive movie – *Voyeur* is the first of a new generation of adult CD entertainment. **Edge** gets behind the scenes

A news reporter sets up the story in *Voyeur*. Here we learn of Hawke's presidential campaign. Note the Philips TV

Your luxury apartment overlooking Hawke manor (left). It's getting close to bedtime (below) – so get the camera out in case something important happens over there...



Format: **CD-i**
Publisher: **Philips**
Developer: **Philips POV**
Release date: **01/12/93**
Size: **1 CD**
Origin: **US**

Voyeur is being promoted as the first real interactive film for adults on the Philips CD-i. Described as a political thriller, the game is R-rated (an 18 in the UK), and has a lot more than politics to keep you engrossed.

Reed Hawke – at the age of 61 – is an ex-astronaut and head of the Hawke Industries empire. A true Republican, he feels that his country is lacking the stern political leadership it needs, and has announced his candidacy for president. He invites the rest of his family to Hawke Manor to tell them of his plans.

His advisors insist that if he is to be president, any skeletons in the closet will have to be hidden forever. No matter what the price.

You play the part of an isolated individual – you have no connection with Hawke or his family, but your apartment oversees the back of Hawke Manor. And you are about to witness the family gathering. Your task: by assembling suitable evidence, you have to ensure that Hawke's presidential campaign fails.

You have the choice of three roles. You can, using your video camera, spy on Hawke Manor and record all the events that happen, and later give this taped information to the police. Your task is made easier by the fact that one of the family has been mentally scarred by Hawke and is prepared to reveal a dark family secret that will ruin his election campaign.

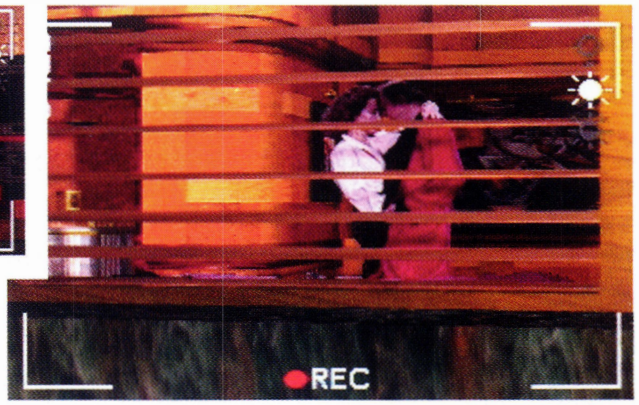
You also get the option of sacrificing yourself and saving that

The Hawkes discuss the evening's agenda, while Reed's 'personal' advisor listens in

Mr Hawke, like several former US presidents, believes in very close working relationships

And through the Square Window, here's Chloe...

... she's Hawke's daughter, and she's sure something fishy is going on. What a girl



Jessica, Reed's sister, believes families should stay really close in times of need

One of the family has been mentally scarred by Hawke and will reveal a dark secret to ruin his election campaign

person by stepping into the story.

The third option is the most risky: You have to prove to the police that a murder or crime has been committed by Hawke. If you are successful, his bid for presidency will end. If you're not, Hawke will expose you as a voyeur and you'll end up spending the rest of your days in a padded cell.

To cap it all *Voyeur* has four scenarios. In each, a different family member will try to expose Hawke.

Voyeur stars **Robert Culp** as Reed Hawke and **Grace Zabriskie** as his wife Margaret. The supporting actors have all been involved in films or TV shows, and the creators worked right up to budget to get the right people for the job. Culp, in particular, gives a commanding performance in his role as the nasty president-to-be.

Gauging from the screenshots, you'd be forgiven for thinking the adult content was just a cheap way of selling the game. It's not – *Voyeur* does contain some suggestive scenes – but that's all they are, suggestive.

The addition of scantily clad actors only adds to the realism (and the humour) of the whole thing.

The effects

in the game were achieved using a new digital production technique. The actors performed against bluescreen, with 3D computer graphic sets, the information was then digitised onto the CD-i disk.

Edge spoke to **David Riordan**, *Voyeur*'s producer, about the project.

Edge How did you get so many good actors involved with *Voyeur*?
DR 'We did a casting call to all the movie agents. They got really excited about this interactive stuff and thought it would be something their clients should consider. We got better people than we anticipated, especially with only a $750,000 budget.

'Some were hesitant at first, Robert Culp was one of those. He didn't know quite what it meant and what it was all about. But he finally agreed and then really got into it.'

Edge How long did the shooting take?
DR 'We shot eight scenes a day, and it was finished in nine days.'
Edge Do you see Hollywood getting more involved with software?
DR 'Yes, it makes sense for people doing feature films or TV to think about interactive versions.'
Edge So who is *Voyeur* aimed at?
DR 'We wanted to make something for a larger audience than just gamers. *Voyeur* is the first step towards that.'

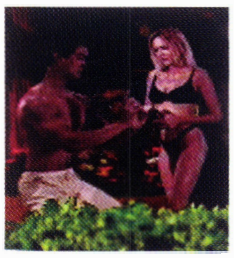
Voyeur is out in the US in October, and the UK in December. If it works as promised, it'll be another reason to start taking CD-i seriously. E

Reed's son, Zack, is mad at his father. But is he mad enough for revenge?

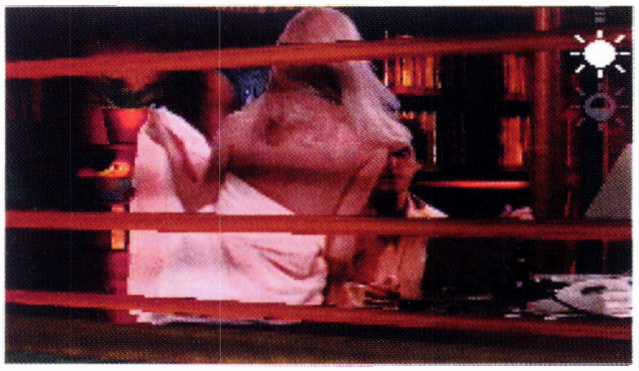
Personnel

Reed Hawke: Robert Culp
Margaret Hawke: Grace Zabriskie
Jessica Hawke: Kat Sawyer
Zack Hawke: Michael Corbett
Chloe Hawke: Sherrie Rose
Lara Hawke: Denise Loveday
Masa: Bruce Locke
Frank: Robert Frank Telfer
Chantal: Musetta Vander

Producer: David Riordan
Producer: David Todd



Masa, demonstrating impressive will-power, practises his Kung Fu moves with Lara

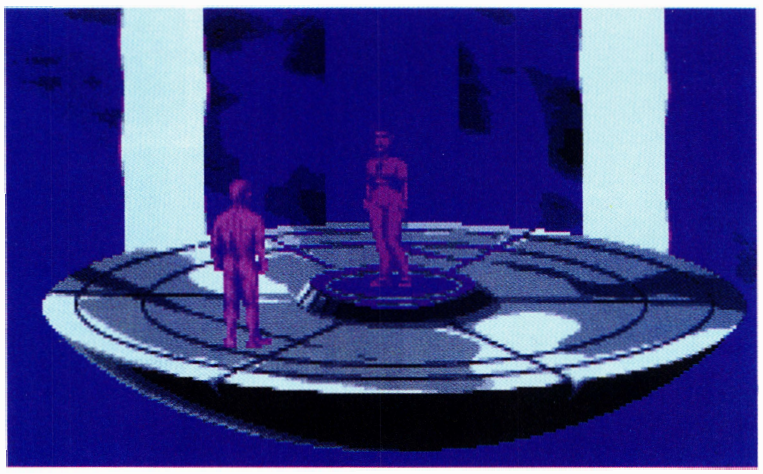


Zack looks for a way to get back at his father. Sadly he seems to have been distracted. Could this be his father's doing? Time will tell...

EDGE magazine November 1993

Revolution's Virtual Theatre technology, developed specifically to drive forward the art of point-and-click adventure gaming, should ensure a healthy future for the genre, and also knock Lucasfilm's similarly inspired games into a cocked hat. Also: why FMV is the wrong path, plus Dave Gibbons on computer game art.

Beneath A Steel Sky



Inside the cyberworld of *Beneath A Steel Sky*. Robert Foster (left) has to collect a vital message from this computerised girl – it's not all work, work, work, y'know...

BASS is the latest offering from Revolution's Virtual Theatre designers. It took two years to develop, and **Edge** asks; does it have what it takes to be another *Lure Of The Temptress*?

Format: **PC/PC-CD ROM**
Amiga A5000
Amiga A1200 1Mb
Publisher: **Virgin**
Developer: **Revolution**
Release date: **late October**
Size: **PC – 15 disks, 1 CD**
Amiga – 10 disks
Origin: **UK**

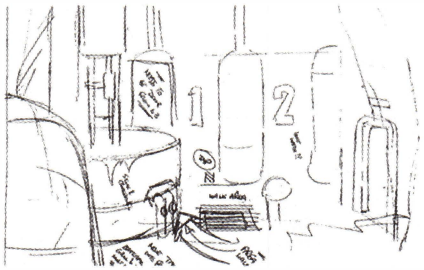
Following the surprise success of *Lure Of The Temptress*, Revolution have spent the last two years innovating their new graphic adventure, *Beneath A Steel Sky*.

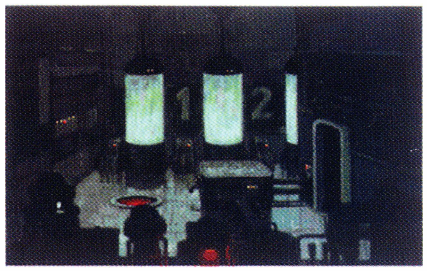
It involves a journey of discovery for one Robert Foster. Sole survivor of a helicopter crash, the orphaned child is brought up the outcast inhabitants of a desert region called the gap (outcasts they may be, but they dress well). As an adult, he is sought out and captured by security forces of nearby Union City, and his township with all inhabitants is destroyed.

Upon reaching the sprawling metropolis, the security craft goes haywire and Foster manages to survive yet another helicopter crash, taking refuge in the shadows...

Why was he captured? Why did they call him Overmann? Who actually is he? These are just some of the questions raised by the game, and which the player must answer as he

Many hours later, Foster finds himself on the base level of the city. This area is just for the most wealthy inhabitants





Three shots of the underworld scene in *Beneath A Steel Sky*. The drawing on the left is an original working sketch done by Dave Gibbons; the second is a colour screen prepared by graphic artist Les Pace, which was then scanned on Apple Mac and touched up to give the final image

'Virtual Theatre is without doubt the best technology – it's better than Lucasfilm, it's better than anybody'

Charles Cecil,
MD of Revolution Software

guides Foster and his robot pal Joey down through the increasingly prosperous levels of the city.

BASS contains 75 main screens, all of which were designed by **Dave Gibbons** – the artist responsible for the stunning Watchmen graphic novel. He prepared line drawings of the scenery which were then painted by **Les Pace**, and scanned into an Apple Mac for retouching.

Dave also drew an introductory comic book outlining Robert Foster's background and subsequent capture. The final image, showing the helicopter hurtling towards the city's skyscrapers, is continued in an animated intro sequence in the game.

Revolution is a small development team based in Hull. Hardly the Silicon Valley of Europe, admittedly, but Revolution's MD **Charles Cecil** disagrees: 'Hull has a very well respected university in computer sciences, and also a couple of miles down the road we have British Aerospace, who are one of the world leaders in Virtual Reality.

'We are joining forces to write some artificial intelligence to put into our games. What we're planning to do in the future is put in artificial intelligence whereby we set the basic parameters and then we let the characters decide what they're going to do themselves. Fundamentally, anything could happen.'

Beneath A Steel Sky consists of six sections, each of which contains more puzzles than the whole of *Lure Of The Temptress*. And while it has a jokey, almost Pythonesque feel to it, the plot is quite serious. 'We spend a long, long time, making sure everything's logical,' Cecil explains. 'A lot more work goes into our puzzle creation than would go into Lucasfilm's.

'We really respect Lucasfilm; we think they're very, very good. But we also think that if you write a slapstick game, the puzzles don't require a great deal of thought. You can jump around and really put tenuous connections in.'

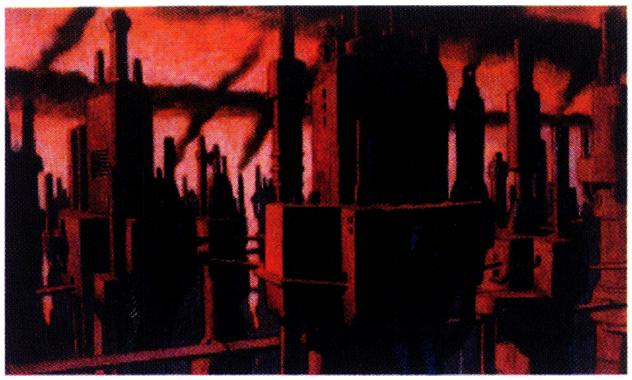
The result of Revolution's logical approach to adventures is their Virtual Theatre engine, which first appeared in *LOTT*. Virtual Theatre generates a world where each character you meet exists outside of the current location – for instance, you can follow any character from one location to another. The game also keeps track of all the occurrences in different rooms and the changes that they might cause to happen elsewhere.

Cecil is bullish about VT, 'Virtual Theatre is without any doubt the best

Finally – you've made it into the underworld control room. From here on you have power over the city's main underworld computers

In the Bellevue area of the city, and Foster anxiously awaits surgery from mad Dr Burke. Here the good doctor mutilates a conscious patient

Continued next page



Scanned in 24bit colour on Apple Mac to give a 1,000x1,000 high-res image, each screen looks stunning – here's the main city view

'There's no reason why hundreds of people in California should know the future any better than ten people based in Yorkshire'

Charles Cecil,
MD of Revolution Software

Continued

technology: it is better than Lucasfilm; it is better than anybody.'

But even with the innovation of Virtual Theatre, *Beneath A Steel Sky* still isn't a million miles away from the stuff that was being done five or six years ago. 'No it's not,' Cecil agrees. 'What we have over our competition is our Virtual Theatre world, but we are aware of the fact that things haven't really changed all that much, and we accept that totally.'

A CD-ROM version of *BASS* is in the works, which will feature an extended intro and animated sequences. There'll also be full speech throughout as voiced by a handful of Royal Shakespeare Company actors.

Overall, Charles Cecil views CD-ROM with a cynical eye: 'I think it's grotesquely underutilised,' he claims. 'I also think it's very misunderstood. And nobody knows what the right answer is: Sierra and Lucasfilm have 300 people in their development teams; but there's no reason why hundreds of people in California should have any better understanding of what the future is than ten people based in Yorkshire.'

He's also similarly unimpressed by full-motion video: 'I'm very excited by everybody thinking that FMV is the answer, because I think they're totally wrong. FMV is linear; and you're never going to get proper interaction.

'I think that by going to FMV people are missing the point totally.'

So with *BASS* almost in the bag, what of the future? Cecil intends to continue refining the Virtual Theatre engine and also to experiment with artificial intelligence. But he is dubious about taking adventures into 3D: 'I don't think that the firstperson perspective is right. I think you can set atmosphere much better by looking at it from the thirdperson perspective.'

Indeed, Revolution used the talents of film students and animators to give a critical assessment of *BASS*'s graphics. And you can do the same when the game hits the shops towards the end of October. E

(Left) The Revolution crew: (top row from left); Steve Oades, Steve Ince, Dave Sykes, James Long; (Second row) Dave Gibbons, Adam Tween, Charles Cecil, Jeremy Sallis, Tony Warriner; (bottom row from left) Paul Humphreys, Noirin Casmody, Dave Cummins

Credits

Designer/director: Charles Cecil
Author/musician: Dave Cummins
Programmer: Tony Warriner
Programmer: David Sykes
Programmer: James Long
Comic/scenic designer: Dave Gibbons
Scenic artist: Les Pace
Graphics/animation: Stephen Oades
Graphics/animation: Adam Tween
Graphics/animation: Paul Humphreys
Sound effects: Tony Williams
Producer: Dan Marchant

The main character, Robert Foster, swings for his life across a chasm between two buildings. Now, just kick in the window and he's safe

Photograph: Courtesy Virgin Interactive

Revolution's Charles Cecil (left) and *Beneath A Steel Sky*'s screen designer, Dave Gibbons

The making of
Beneath A Steel Sky

Fans of 2000AD or the Watchmen comic will recognise the scenic artwork in *Beneath A Steel Sky* straight away: the man behind all of it is ace artist Dave Gibbons. **Edge** talked to him about his work

Dave Gibbons got involved with the videogame business in a roundabout way. After the brilliant Watchmen graphic novel appeared, a movie was proposed and Ocean Software planned to make it into a videogame.

The One magazine did a piece on the Watchmen book and movie, showed the author, Alan Moore, the director, Terry Gilliam, but didn't mention the guy who drew every frame in the book – Dave Gibbons.

Dave called the magazine and after much apologising (not to mention a free Amiga), he was introduced to many people in the industry, including Charles Cecil, then working with Activision.

'He was interested in using my skills for a computer game,' says Dave, 'and lo and behold, several years later, he called me in to help with the design of a game.'

This might seem a drastic departure from the world of superheroes and villains, but Dave disagrees: 'Many of the skills in comic design are applicable to computer games and interactive software. Comics in many ways are like storyboards; comic book stories tend to be linear narrative in the same way that a lot of computer games are.'

So, over the period of a year, Dave designed some 75 scenes for *BASS*. He'd discuss specific screens with Cecil and the in-house designers, take notes and do rough sketches there and then.

'If I was really cooking I could, as pencil drawings, maybe design eight screens in a day,' Dave enthuses. 'Although, as in anything, you come across certain screens where you can spend two days just trying to fix them. And, as with any long-term endeavour, by the time you get to the end of it you realise that things earlier on could be made better, so you go back and revise those.'

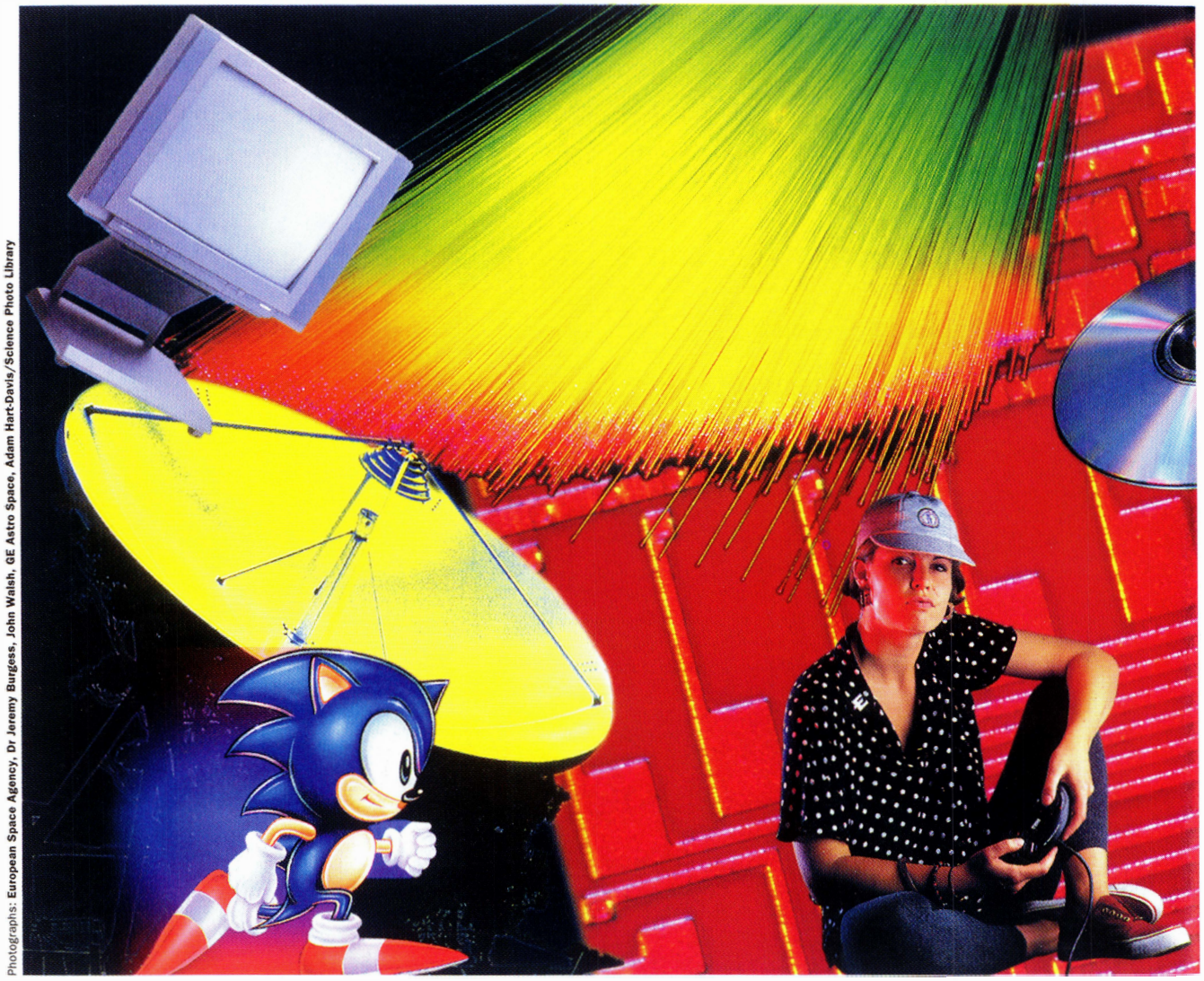
As well as the scenery, Dave also drew an eight-page comic strip that acts as the introductory manual. This was so successful that Revolution are planning to include animated comicstrip-style sequences in the CD-ROM version. This has found favour with at least one person: 'We're ending up with things that have a lot of the virtues of movies, games, and of comics', Dave claims. 'And I would rather see a personal vision on screen than filmed live-action. I have an idea that with CD technology there are going to be a lot of little-known actors photographed and appearing on our screens. I think if you have a graphic artist involved, you get something even better than reality.'

Two of the original sketches from the introductory manual for *Beneath A Steel Sky*. The cutout figures above are Foster (above left), a Gap dweller (above right), and a security trooper (right)

For the technically minded, Dave works on Bristol Board, a special type of card; he sketches first with a mechanical pencil, and then inks in with a dip pen and a good quality watercolour brush. He uses markers for large areas, and a Rotring pen to do the lettering.

'The beauty of comics is that all the tools are simple and cheap. And as things develop, this is going to be the joy of computer art as well. It's going to be very easy and very cheap to do.' E

With Sega, 3DO and Nintendo all heavily committed to gaming over networks, how will this shape the future of interactive entertainment? And what does PC OS giant Microsoft have to do with anything? In this feature we go looking for the answers (and find out about the trouble with birds landing on satellite dishes).



Photographs: European Space Agency, Dr Jeremy Burgess, John Walsh, GE Astro Space, Adam Hart-Davis/Science Photo Library

Network television

Imagine becoming part of a national games and media communications network just by switching on your TV. Sounds unlikely? It's already happening. **Edge** makes contact

The dream of a network of games and entertainment services is nothing new. But in the next twelve months you'll see that dream start to become reality. Further in the future there's even the possibility of direct broadcast games, where new parts of a videogame are continually downloaded from satellite or cable while you're playing, and where you interact with other players on a national, or international network.

Both Sega and The 3DO Company are planning to get a network for their machines up and running in 1994, and the Sega Channel has just started limited broadcasting via cable in the US.

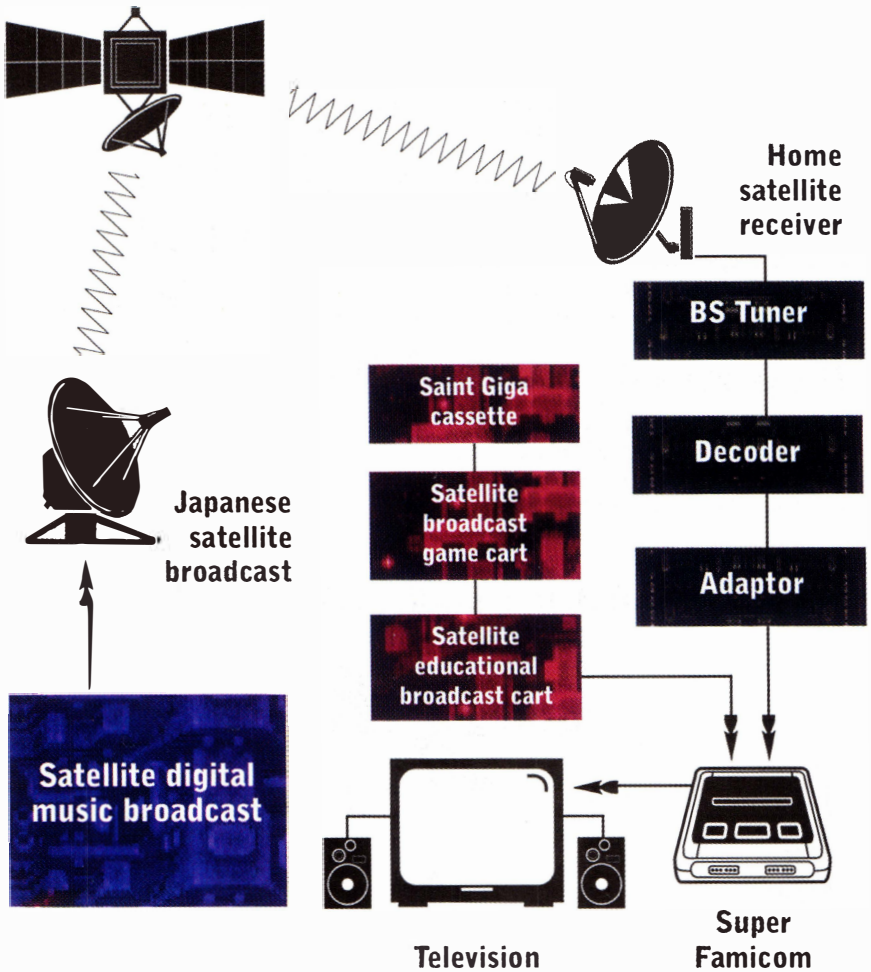
Another games network, called St Giga, is also planned by Nintendo out in Japan. The service, which will be online in April 1994, will be called simply the 'Message Information Broadcast Service System' and will give users access to an information and music channel. There will also be a 'Game Battle Service' where users can play tournaments via satellite with other Super Famicom owners. The first tournaments planned for St Giga are *Super Mario Kart*, *Dragon Quest* and *Final Fantasy*.

But significantly, Nintendo's original plans for supplying new videogames via satellite have been scrapped, apparently due to technical and legal constraints.

But another Famicom-based system has been in limited use in Japan since 1989, offering electronic banking, share trading, teleshopping, airline reservations, postal services, a fitness routine and even horserace betting. As Nintendo's US

Continued next page

The Nintendo St Giga network



Nintendo®

The Nintendo system needs a specially developed St Giga decoder and adaptor and an RS tuner. Using a special St Giga cart, and an adaptor which slots into the Super Famicom, you log onto the service to receive information and play in games tournaments

The Sega Channel is the product of an alliance with Telecommunications Inc (TCI) and Time Warner, and it's currently being testmarketed in 350,000 households across 13 US cities. Sega plans to go nationwide early next year. If it's successful, it's certain to quickly make its way over to the UK.

But Sega is already facing its biggest potential rival – the 3DO machine, with which **Trip Hawkins** plans to create a new standard for home multimedia systems. And 3DO has the backing of, among others, the US telecommunications giant AT&T. Hawkins' plan is to link a grid of 3DO machines over the AT&T network as a way of delivering games directly into the home. He's also signed up Time Warner, the second largest cable operator in the US – and also the same company backing the Sega Channel.

It's hard to say at this stage which system will take off and become the home multimedia standard – 3DO are keen to point out how their tie-in with AT&T gives them access to industry standards for video compression and signal processing, but then, Sega's system is already rolling. The basic 3DO machine is due in the US in October, and a network version is promised for 1994. The UK launch of the basic system will be next Spring.

According to Sega UK's **Andrew Wright**, subscribers to the Sega Channel will just preview the selection of games available, and then download the one they want to play directly into their Mega Drive.

The cost of subscribing to the channel will be around £6-£10 a month. Subscribers will also have to pay for a special lead that plugs into the Mega Drive cartridge slot and links it to the cable TV receiver, costing around £35.

Initially subscribers will be offered a choice of 20 games which will be rotated every month. Just like in TV movie channels, there will be a multiple selection of games rather than a whole library of titles available all the time. Subscribers will simply use their controllers to pick a game from the menu and then hit the 'Send' icon. But unlike cartridges you won't be up and playing instantly: the downloading process will take a couple of minutes.

The Sega channel will also offer demo levels from unreleased games so you can get a flavour of them before they hit the shops, and teletext-style pages offering news, tips and letters.

The UK cable TV companies are itching to get their hands on the Sega Channel. but Sega itself is not so sure. Compared with the US, where almost 80% of households have access to cable TV, the

spokesman **Don Varyu** says, 'There are more than 112 million Nintendo game machines worldwide, and less than a third of those are Game Boys. There's about 80 million machines capable of porting to a network.'

But the competition for the interactive home entertainment market is steadily hotting up. While Nintendo's plans for world domination, and particularly for a US network, have so far failed to materialise, Sega is already delivering games to the home through cable TV. It's still on a small scale, but Sega has big plans for the system.

Continued

UK cable industry is tiny. Only 454,000 homes in the UK watch cable TV, out of a total of 2.2m households that have been passed by the cable TV lines.

'That is a very small proportion,' says Sega's European managing director **Nick Alexander**. 'It makes us wonder whether it's viable for a massmarket company like Sega to use cable.'

But given that Sega is committed to a European launch for the Sega Channel if it succeeds in the States, what other options are there? The Nintendo route – via satellite – is the next obvious course. A deal putting Sega TV onto Sky's Astra satellite could give it access to 100m homes across Europe in one stroke. But, as Nintendo has discovered, there are big disadvantages with satellite technology.

'We've looked at this and it seems that the time it takes to download games off air is a major problem,' says Alexander. Apparently it takes about about half an hour, and the more exposed nature of satellite broadcasting – a bird landing on your Sky dish could corrupt a download for instance – also creates problems.

Another option for linking up the network is via the phonelines. People have been using these lines for years to get access to news and entertainment services via modems. But there's more to it than that – Sega users in the US can now buy modems that allow them to play games against their friends over the phone.

Baton's Teleplay system is already on sale and comes with *Terran Wars* – an Asteroids-style shoot 'em up. The unit will be sold in the UK later this year.

There's also a similar addon called Edge – the result of an agreement between Sega and AT&T. Made up of a modem and a speaker phone, Edge allows competitive play and also lets you talk while you play. It'll be available in the US next summer and will cost between $100 and $150. UK launch is likely soon after.

But for gamers in the UK, an important breakthrough was recently announced by BT – the biggest UK phone company – when it gave details of its so-called Project ICE, which could give videogame firms access to 26m households in the UK over the phonelines. ICE stands for Information Communications and Entertainment, and is basically BT's response to the growing threat of cable TV. It offers film, home shopping and games as well as basic telephone services.

Both Sega and Nintendo have apparently had talks with BT, but there are still problems that must be solved before ICE goes live – the most glaring of which is that the law as it stands forbids BT from broadcasting any entertainment services over its phonelines. BT admits this is 'a grey area' but it insists that the one-to-one nature of ICE – ie you individually select the game or video – means that it is not 'broadcasting'. The cable TV companies, who have a lot to lose, are adamant that it is, and are calling on BT's regulatory watchdog to ban the project.

The dispute should be sorted out by the end of the year, but one thing is certain: in 1994 some of us will be feeding our 3DO, Mega Drive and SNES systems with broadcast signals rather than carts. *Sonic* and *Mario* with ICE, anyone?

The problems of playing games through a domestic phone are obvious enough – nobody else in the house can make or receive phone calls while you're connected. Enter a technology called

'There's about 80 million Nintendo machines worldwide capable of porting to a network'

Don Varyu, Nintendo US

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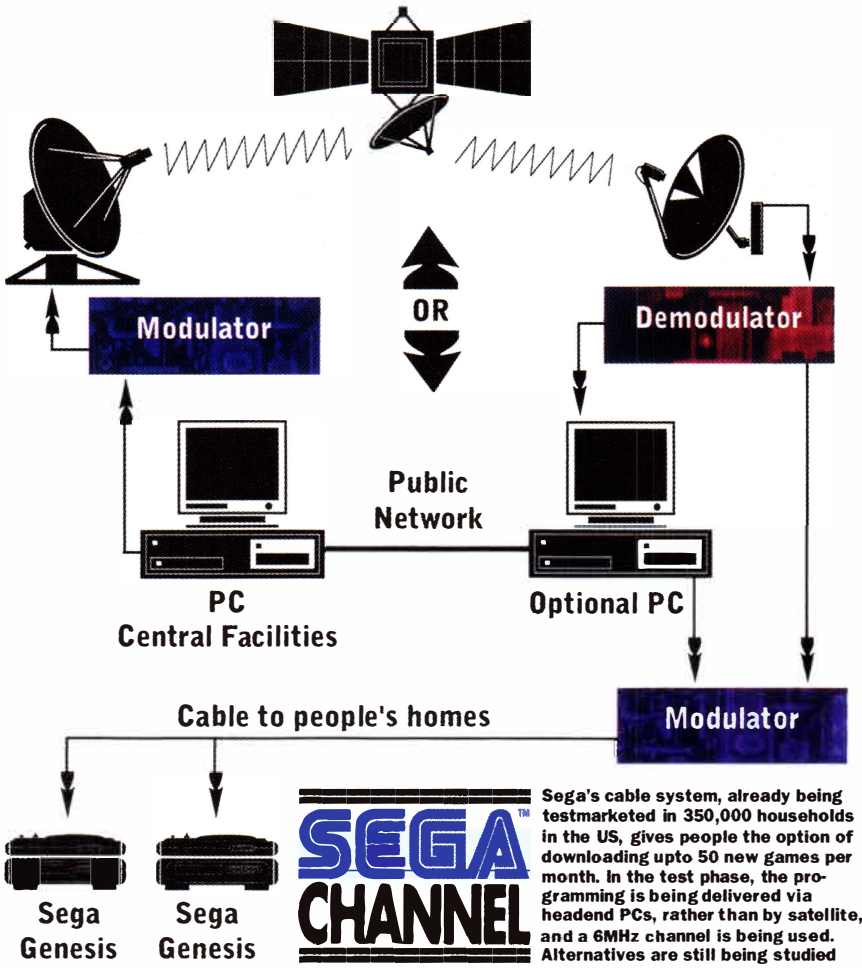
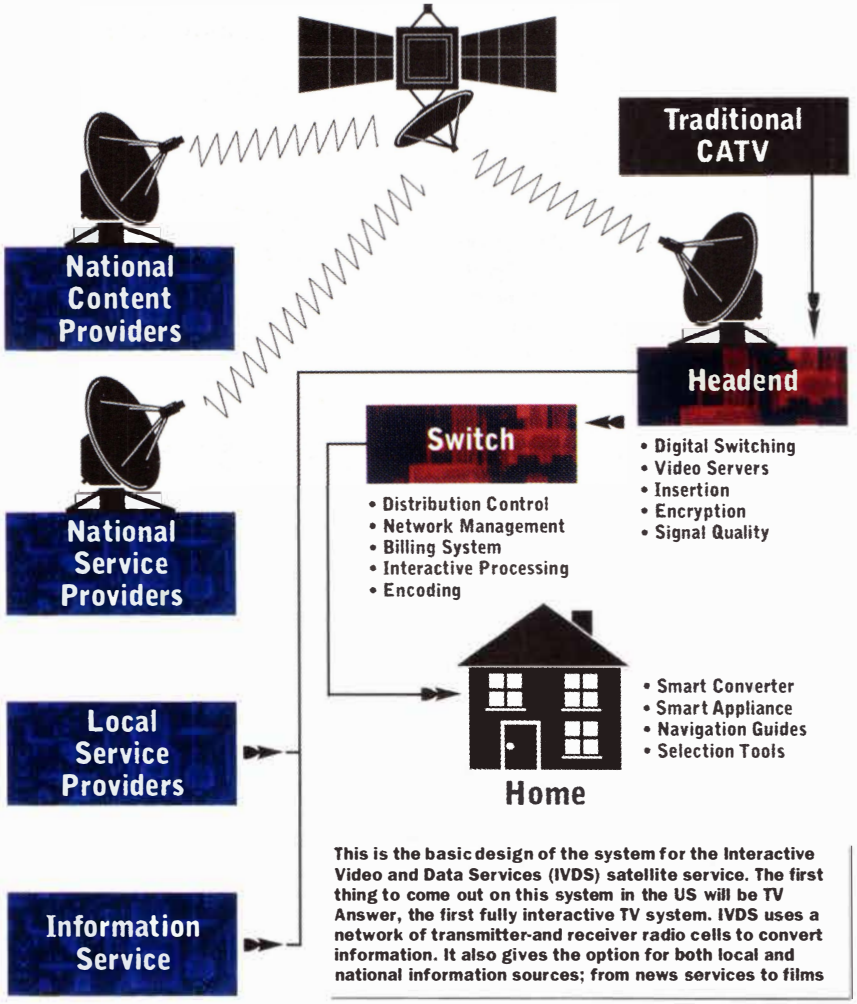
Sega Channel cable games system



Sega's cable system, already being testmarketed in 350,000 households in the US, gives people the option of downloading upto 50 new games per month. In the test phase, the programming is being delivered via headend PCs, rather than by satellite, and a 6MHz channel is being used. Alternatives are still being studied

The IVDS interactive TV network



This is the basic design of the system for the Interactive Video and Data Services (IVDS) satellite service. The first thing to come out on this system in the US will be TV Answer, the first fully interactive TV system. IVDS uses a network of transmitter-and receiver radio cells to convert information. It also gives the option for both local and national information sources; from news services to films

Interactive Video and Data Services (IVDS). Pioneered by the Interactive Network in California, IVDS uses a network of transmitter-receiver sites or 'cells', like Cellphone and Vodafone mobile phone networks. These pickup the radio signals from special TV remote controllers equipped with their own aerial. It's all linked by satellite to a computer mainframe, and each cell shares a 1MHz slice of radio spectrum recently put aside by US regulators for the newly emerging IVDS industry.

An IVDS network called TV Answer is due to start in the States before the end of the year. Its primary use will be in interactive television, but interactive videogaming will be the next development. When TV Answer starts, viewers will be able to respond to TV game shows, shop, bank or explore other services using a $700 home transmitter/receiver or 'Personal TV Unit' about the size of a VCR, made by computer giant Hewlett-Packard. Each subscriber will be given a unique PIN number, and fixed information such as address, phone number and credit card number will be stored in the system.

But there is an even simpler way of making TV feel interactive, even if in the strict sense of the word it isn't. Known as 'video-on-demand', it works by broadcasting so many channels that the same information can be repeated at regular intervals. So if you select a game from a menu, for instance, your computer might tell you that it will download in 20 minutes, and how much it will cost.

Another possibility with this type of interactive TV is for a movie to be customised according to what you say you want to happen, a feature promised for future movie disks on the CD-i system. Instead of switching tracks, the computer would weave this apparent magic simply by switching between parallel stories broadcast at the same time.

This is the secret of so much of this interactivity, whether for TV, movies or videogames, is that it relies on having a large number of simultaneous channels. When you have hundreds of channels, almost anything is possible. But creating so many channels depends upon the next big thing in TV – digital broadcasting. Unlike today's analogue broadcasts, digital programmes can be compressed. This currently allows up to ten channels of TV to be broadcast in the space normally occupied by one – and this figure seems likely to increase.

It's all thanks to MPEG2, the broadcast version of the digital compression technique that allows full-motion video to be played back from CD-i disks, and from the impending 3DO games system. MPEG stands for the international technical think-tank 'Motion Picture Experts Group' (pronounced 'em-peg').

The first public digitally-compressed TV system will be launched by Hughes Communications in the US. Called DirecTv, it promises to deliver some 150 channels of TV from just two high-power Hughes HS-601 satellites, reaching the home via 18-inch dishes and $700 receivers. The first satellite is due to be launched from French Guyana on an Ariane rocket in December. DirecTv will initially

Continued

repeat pay-per-view movies every 30 minutes, so that subscribers can choose their own start time.

The broadcast division of Sony will supply all the digital tape playback equipment for the DirecTv system, based at its massive 50,000 sq ft broadcasting centre currently under construction at Castle Rock, Colorado. Capacity on this scale is confidently expected to nurture a flurry of US games channels, allowing gamesters to buy and upgrade games via DirecTv, without having to queue at a checkout till ever again.

So that's the way it's going to go. Interactive TV will spawn a million interactive shopping, movie watching and gaming experiences, and it's all just round the corner. The only question left to be answered is which interactive TV system will become the standard for the future.

A good clue to this can be found if you look at who's heading the list of interactive TV backers at the moment. And some of the really big names are starting to put their signatures down on the interactive TV slate. Microsoft chairman **Bill Gates** has made it plain how involved his company plans to become in interactive television. And as he's the man behind the operating system of almost every PC in the world, not to mention the fact that he's the richest man in the US, people tend to take what he says seriously.

Microsoft already has an agreement with global chipmaker Intel and General Instrument corp to collaborate on a machine that could be used for twoway interactive television transmissions. And there are even more bigname partnerships from Microsoft to come.

The company recently held toplevel discussions with Time Warner and Telecommunications Inc about setting up an interactive TV system. No deal has been finalised, but when it is, you can guarantee it will make big waves in the industry.

But when is all this likely to happen over here? SES, the Luxembourg-based owners of the Astra satellites which beam Sky and other programmes across Europe, has promised that it will be at the front of digitally-compressed multichannel TV. The first of its digital satellites is planned to enter service in 1995.

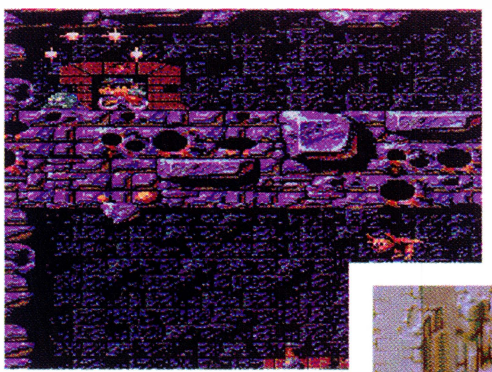
And Renegade, publisher of games by the Bitmap Brothers, have recently signed a deal to convert its titles into interactive TV games. Triton Interactive Television, the other partner, have developed an interface enabling players to phone in and control a game using the phone's keypad. The breakthrough here is continuous recognition of tone signals, giving, so it is claimed, the same level of response as console versions. First game to get the touchtone treatment: *Magic Pockets*. Other Renegade titles such as the brilliant *Sensible Soccer* and the not bad *Chaos Engine* should also appear on the new medium.

Meanwhile the BBC and ITV hope to start 'simulcasting' programmes in digital format alongside normal TV from about the same time. Thanks partly to the scrapping of the proposed fifth TV channel earlier this year, there will initially be enough room for four or five digital channels. But at least 70 digital channels will become available when all of the existing analogue transmissions cease in perhaps 15 or 20 years time.

Whatever happens, television will never again be just the passive experience we know today. E

Interactive TV will spawn a million interactive shopping, movie watching and gaming experiences

Renegade's interactive TV games

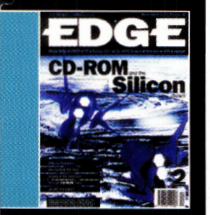


***Magic Pockets* will be the first game to get the interactive TV treatment. Under the new partnership between Triton Interactive Television and Bitmap Brothers' publisher Renegade, *Magic Pockets* will come out in a new version that can be played via a standard telephone keypad. Continuous recognition of tone signals allows fast response, at least comparable to other versions of the game, or so the developers claim...**

Renegade's okay-ish *Chaos Engine* is another one that's lined up to get the Triton Interactive TV-touch. Remember this one? We reckon it's a pretty suitable game for playing over the phonelines. It'll still have that unusual viewpoint, where you look down at a weird 45 degree angle

***Sensible Soccer*, which is shortly to appear on the Super Nintendo, is the Amiga's all-time killer app. It could really be the one to get people moving towards the Triton games concept, but it all depends on the level of interactivity that you get over the phonelines. Triton Interactive Television promise you'll get loads. But from some of the sad phone keypad stuff we've seen so far, we'd advise you to try before you buy**

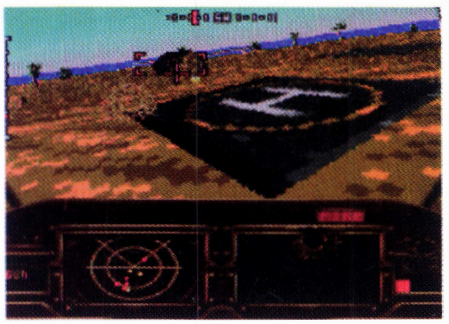
Thunderhawk



The review format adopted by issue two of **Edge** has remained largely unchanged ever since, although screenshots were once often grouped by category and labelled accordingly. As for scoring, being able to play a mission almost completely by radar may count more against a game in today's climate. And 'product'? Let's not.

Format:	Mega CD
Publisher:	Core Design
Developer:	In-house
Price:	£45
Size:	1 CD
Release UK:	01/09/93

With the radar down, and that tank heading in your direction, it's all looking rather ominous



Looking back at your own helicopter pad, and the South American mission is about to begin

Some people claim that *Thunderhawk* is the first game to show the real potential of the Mega CD. Now that's a big claim. And *Thunderhawk*, however you dress it up, is just another chopper sim.

Still, it's chock full of great presentation screens, from the stirring intro through to the better animated scenes – like the bit where your chopper takes off, or the bit in the projector room where the mission is explained.

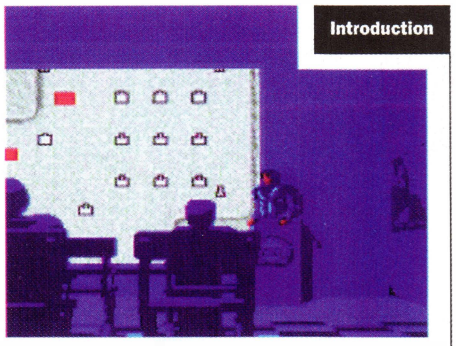
Visually, Core's *Thunderhawk* is a very appealing product. And yes, the game proper is a big improvement over much of the trash that Mega CD owners have had to endure so far – but is its beauty still only skin deep?

There are a variety of missions – ten in total – and each is split into a number of sections. The missions are all similarly structured: ie seek out a destroy a variety of enemies – the only real difference is the places in which the devastation takes place.

The graphics convey a good feeling of speed, and you get a choice of three weapons: cannons, rockets and missiles. Using your onboard radar, targeting and gunning down the enemy is simple. Almost too →

Using a custom graphics chip, Core's *Thunderhawk* looks stunning. It's not just limited to doing totally flat and boring landscapes either

Select any of the ten missions you like. A sampled voice will explain the mission in detail

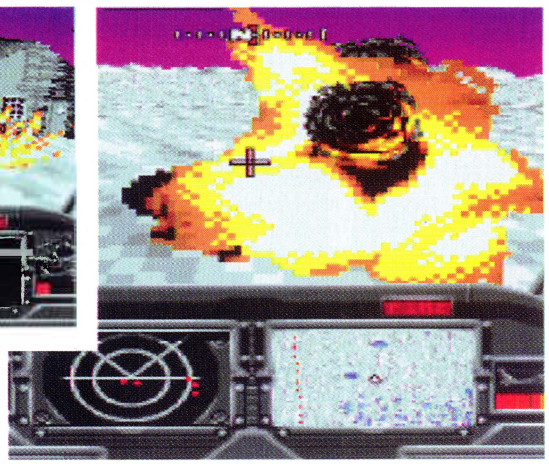


In the projector room, more detail is given to you about the mission, visually as well as verbally

Mission **breakdown**

Those *Thunderhawk* missions in full:

1 **Arms Running** (South America) fly in low and destroy a small terrorist arms plant: Eliminate terrorists.
2 **Stealth Down** (South America) a stealth bomber has crashed in the jungle. Prevent enemy capture.
3 **Canal Crisis** (Panama Canal) Wipe out hostile shipping and allow merchant fleet to resume trade.
4 **Recapture Town** (Central America) guerrillas have captured a civilian town. Destroy enemy base and liberate the town.
5 **Bio Research** (Alaska) a research station needs investigating. Hostile forces are suspected to be in the area.
6 **Convoy** (Eastern Europe) a medical convoy needs a strongarm escort to get into a besieged town.
7 **Liberation** (Middle East) assist friendly forces recapture territory and suppress enemy.
8 **Oil Dispute** (Middle East) Defend an oil rig against incoming enemy.
9 **Chemical Warfare** (S E Asia) Destroy chemical weapon facilities to halt an invasion of neutral territory.
10 **Piracy** (S China Seas) Take out enemy ships, and defend friendly vessels.



The enemy are well protected; so wait till you get missile lock

The Alaskan level is quite tricky. Radio contact is down and the chopper's danger sign is flashing (above left). Homing missiles have to be used sparingly and accurately – save them for a real target, like this enemy base (above)

← simple. Because the radar is very accurate – not a bad thing in itself – you can fly each mission almost totally ignoring the main play area, and this is certainly a bad thing.

You have total freedom of movement within a large perimeter and once your mission is complete you just head out of the perimeter back to base and the next mission.

Relying on a dedicated graphics chip, the scaling effects are very impressive, as is the level of detail, and it can only be the sign of things to come for the Mega CD.

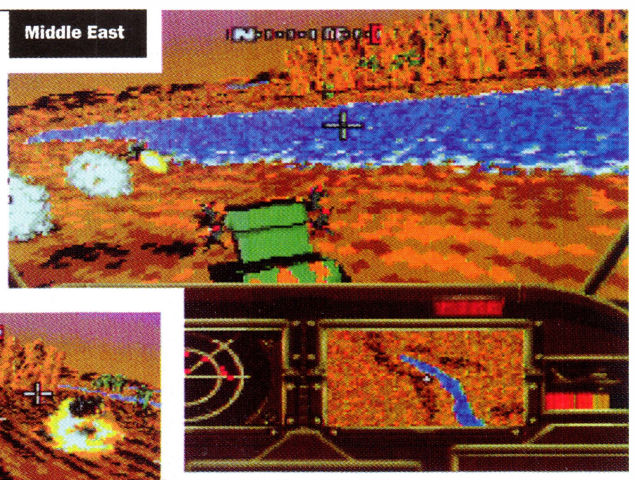
Overall *Thunderhawk* plays well enough – if a little simplistically – but It's ironic that one of the best Mega CD products still doesn't fully use the machine's potential.

Things are moving in the right direction for the Mega CD, but don't expect *Thunderhawk* to keep you entranced for weeks – it won't.

Sill, if Core can add substance to these visuals for their next Mega CD product, we could be in for a real treat. **E**

Edge rating: **Seven/10**

Visually the most impressive of the missions (below) is set in the Middle East. This level requires all the usual gun toting, and great skill and dexterity, as you fly into and around some rather large rock formations. The enemy are well entrenched, too

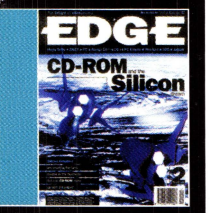


The radar (left) shows many incoming missiles. The enemy use the rocky desert scenery to their advantage, appearing at the last possible moment, guns blazing

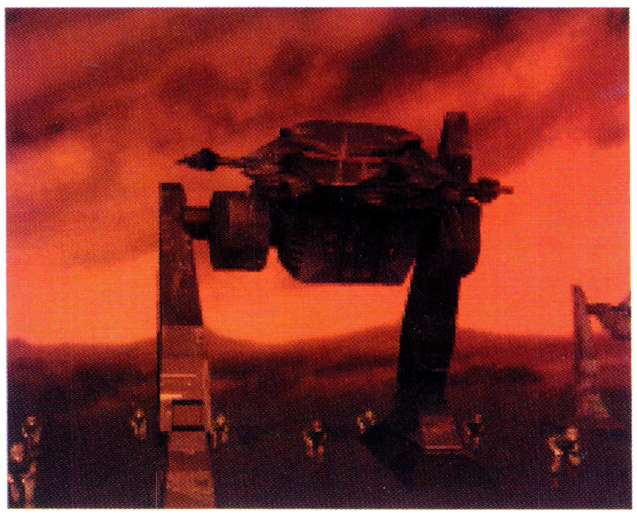
viewpoint

What's your **opinion**? **Write** and **tell** us:

Edge letters, 30 Monmouth Street, Bath, Avon, BA1 2BW



Response to the first issue of **Edge** is overwhelmingly positive, and there's no excuse not to feature hefty lumps of praise in issue two's letters pages. There's room, too, for a letter suggesting that technology is moving too quickly for game designers. Hands up if you've ever written a letter just like it since...



The brilliant *Jagganath: Engines of Destruction* intro sequence, but the game's been axed. See letter from its designer, Jonathan Lee Howard

I was delighted to see that the 3DS showreel of *Jagganath: Engines of Destruction* made it into the 'Top Five Intro Sequences' chart of **Edge** one.

As the game's designer, I naturally feel very paternal towards it and was happy to pass on **Edge**'s comments to Angus, Jagganath's animator, and Paul, the musician.

What you may not know is that *Jagganath* has been written off. It, Microprose Manchester, Microprose Leeds and many jobs were all victims of a corporate reorganisation whose logic remains opaque to all but Spectrum Holobyte.

Best of luck with future issues of **Edge**.

Jonathan Lee Howard, Cheshire

We're sorry to hear about Microprose's redundancies and it's a great shame that a game that seemed to have so much potential has been axed. Sadly, the UK end of the operation seems to have suffered for the excesses of the US end.

In the UK, we have the world's strongest concentration of gamesmaking talent, but it's small teams who are the most creative. In the US, they tend towards teams of thirty of forty working on one single project. Can that be justified?

Do they really get better results?

E

Congratulations on the first **Edge** – it was stunning. Towards the end you invited readers' views

'What did I think? Liked it a lot. I was really impressed that your 3DO article was not an exercise in arse licking, no, you pointed out the problems the 3DO Company are having with the development systems etc, and the timescale of the launch. Liked that.'

Anthony Jackson, Lancashire

'Out of 3DO, Jaguar and CD32, help me choose the right system.'

P Ball, Croydon

on CD. As I see it, we are on the brink of the greatest advancement in 'our' industry.

I cannot recall such enthusiasm, caution, disappointment and general ignorance all rolled into one ever before.

Come on software publishers, it seems as though you are blaming us – the consumers – for the apparent flop of CD technology. Take a step back and then reconsider. Ever since the dawn of the potential of CD gaming we have been promised cheaper, better quality products. But so far, where are they?

It's not that good games are no longer being produced. Rather, the software giants are running scared from a sign saying 'Vacancies – CD band wagon, space still available'. If floppy disks are piratable, STOP PRODUCING THEM! and invest in CD technology and CD games before you are left behind...

James Grant, Somerset

It's not just floppy disks that are an endangered species, remember. Software developers want to see the end of

cartridges, because they are too expensive and take too long to make, plus they have a history of tyrannical control on the part of the hardware licensers, Sega and Nintendo, who publishers feel take too big a cut.

CD-based systems will be 'open' to licence-free development, and so, though the hardware will cost us more, we won't have to pay so much for games.

If 3DO succeeds in becoming the industry standard for CD-based games, it can only be a bad thing. If it were to happen that all new machines were 3DO compatible, nobody would ever try anything new, which ultimately would slow down progress in games technology.

Peter North, Barnes

Not going to happen. As you can already see, 3DO faces severe competition before it starts, from Jaguar, Amiga CD32 and possibly the Nintendo/SGI 'Project Reality' – if it actually exists. Price is the big factor – Jaguar delivers a 3DO-standard spec for $200 rather than $700, while Commodore are quite convinced that no-one can do a CD-based console cheaper than theirs.

People are saying that the Mega CD is doomed, but they seem to forget that the first ground-breaking games for the Mega Drive, such as *Sonic*, did not appear until a year or more after its release.

As for CD games not being any different from normal games – all I can say is, have you been in an arcade recently? All the machines are *SF II* clones, so there's hardly much originality going on there, either.

Paul Clifton, Swindon

The Mega CD is beginning to look like a patch-together of different technologies. When you consider that a Mega Drive/CD combination costs £370 in Dixons and for that you get a machine with relative display and speed limitations in comparison to the cheaper Amiga CD32, you have to admit the competition is hotting up.

But Sega have a big market presence, and better Mega CD stuff is now just starting to appear. Who knows?

Congratulations on producing such an excellent magazine! This sort of publication has been a long time coming, with the newsagents' shelves crammed full of magazines which seem to be written by children for children.

Stephen Brealey, Beeston

Steve Jarratt is actually only thirteen years old. He just looks ancient. Hur Hur.

I have to admit I was quite impressed with **Edge** one – after all, how many magazines tell you what fonts they use?

I like the way you give us all the technical data for forthcoming releases as opposed to the game plots. You also cover the frame rate of games, an aspect which, although counted by many as a trainspotter's hobby, is in fact a very important aspect of any leisure title, simply because it shows how smooth, fast and playable the game is going to be.

Fifty frames per second (aka 50fps or 50Hz) is incredibly fast and smooth – play a game with this frame rate and you're in for a great time. However, you need a very fast 68030 (as used in the Sega coin-ops) or '040 (as used in the Amiga 4000) to make games which contain a high level of detail run at 50fps.

I'm not talking about platform games, here – most of these run at 50fps anyway – but 3D vector games, which are infinitely more realistic. 20fps is good but not mind-blowing (see *Starwing*), while 30fps is impressive for a high-detail simulation (see *Virtua Racing*). Anything around 10fps is quite unplayable, but once you're over the 40fps barrier, expect jaws to drop all round.

Nathan White, Walsall

Much rubbish is talked about frame rates. Okay, they can be important, and the ideal rate for UK players is 50Hz – because that's the refresh rate of a PAL monitor (TV is half as much).

But bear this in mind – the classic Disney movies had animation running at just 24fps and the vast majority of cartoon animation that's carried out today, whether for TV or the movies, runs at half that – just 12 frames a second.

It's all a question of horses for courses.

'Edge simply takes the piss out of its competitors, it's that good...'

Lars Janssen, East Sussex

'The price is justified by the sheer amount of information found in your magazine and I hope you will be able to keep this quality for many years to come.'

Kin Wai Kam, Manchester

Give yourselves a big slap on the back for the production of an excellent adult journal. The presentation is eye-catching and has a real quality feel. Good to see you haven't bogged down Edge with hints and tips. Videogaming publishing comes of age.

Richard De Silva

The question of whether or not the Amiga CD32 is a success definitely hinges not on the machine itself, but on the support of the software houses and the strength of their games.

I quickly got myself an A1200 at the beginning of the year because of what it could potentially offer in gaming terms, yet eight months or so later I'm still waiting for some 1200-exclusive games, not just 1200-adapted versions of existing titles. My point is that if the CD32 is to succeed, it depends on establishing a strong software base immediately and offering a stunning game as part of a Commodore package.

This is something the A1200 never had, and still doesn't have.

Martin Wellbelove, Attleborough

Indeed, but is that not true for all new systems? It's a truism nowadays that the success of a new piece of hardware depends entirely on the quality of the software released for it, and all the manufacturers protest that their machines will have not only quality games but also a wide range of titles.

Commodore claim that 90 titles will be ready for the CD32 by Christmas, but in fact many of these are old CDTV discs which are not worth considering. That leaves around 30 up-to-date titles which **Edge** would expect to see actually onsale.

When you look at the potential quality of these, there are a number that promise to mix excellent graphics with excellent gameplay, but there is a heavy bias in the direction of platform games with the likes of *Putty 2* and *James Pond 3*.

Three games are finished as **Edge** goes to press on September 14th, and these are *Pinball Fantasies*, *James Pond 2 – Robocod* and *Diggers*. The latter is the game which will be bundled with the CD32, though the first machines which went onsale in Rumbelows stores on September 5th included no discs to play on the machine – making it a rather expensive doorstop!

Too much technology could cause a downfall in hardware demand, I believe. Companies like Sega and Nintendo are pushing themselves too hard on producing the most

Continued next page

viewpoint

mindbending machines, but what I am worried about is that newer machines like 3DO and the forthcoming Jaguar will eventually ruin the market.

There will be no enthusiasm when we see a new game even though it has a great intro, great graphics and great sound, because the consumer of the future will have seen it all before – 'Been there, done that!'

Slow down, rest easy and let games catch up a little with the ever-changing face of the machines. As they say in the Sega ads, welcome to the next level!

Kin Wai Kam, Manchester

Point one is that machines will always be ahead of the games and it always takes an age for developers to make the best use of the technology. Amiga games were reaching their peak in 1992 five full years after the release of the A500 – now they have to do it all again with the new AGA chip standard.

Point two is that real advances in games design and technology – genuine milestones – don't happen very often. You'd have to start with the early coin-ops of 1981-2, then the first home computer classics like *Revs* and *Elite* in 1984-5. After that, you're limited to a few major advances such as the point-and-click control of *Dungeon Master* and the texture-mapped 3D in *Ultima Underworld*.

The latest technology has the potential to bring further, major advances in playing environments, and playing styles, but it could still be some way off happening. E

Okay it's a 3DO player – but is it an American or a European model? See question below

Will an American 3DO machine work on a British TV or is it worth waiting for the British release? Also, will the titles be the same on both sides of the Atlantic?

Robert Anthany, Tamworth

First off, Edge correspondents please note that there is now a separate section to deal with your questions about gaming hardware and software – Q&A – and it's over there on the right. Please address all your questions there from now on.

Right, on with the question. Indeed, an American NTSC 3DO will not work with a British PAL TV and so a conversion will definitely be necessary.

But no doubt someone will do an unofficial job on an imported machine.

3DO have not said what plans they have for a PAL version, but it should be easy enough for them to include a PAL conversion feature inside the machine with no serious detrimental effect on the picture quality. E

Darryl Still, Atari UK's marketing manager, with a few words of caution (below)

You want opinions? You got 'em.

The magazine looks great, well-designed, good quality, nice layout, adult journalism (mostly). The computer mag grows up!

BUT I find myself worrying that you have immediately adopted the same fawning attitude to the new boys as many other sectors of the industry. I hoped you would start with a clear vision, but...

Some examples? Bloody 'eck. You have forced me to defend Commodore!

Your articles on ourselves (Atari) and Commodore displayed a commendable balance against each other, but compared to your 3DO coverage??

Have you asked yourself why you can list such a mixed bag of history for these two companies? Simply because we have been there, done it and invented the T-Shirt. 3DO do not have a history (some even question if they have a product!), so they cannot be reviled for their failures (yet), but to keep a balance, neither can they be applauded for any successes.

Atari VCS to ST, or in Commodore's case C64 to Amiga, prove both companies have a considerable track record in the massmarket and therefore are better placed to do so again! The benefits of experience are essential, and we are confident – warts and all – that Atari is the most likely company to make Jaguar roar.

I would also like to take umbrage with your mention of the Falcon. This cannot be compared with CDTV. Falcon is not a lowcost massmarket computer, it is a specialist application-based home computer retailing at over £500. In point of fact, the only system available when the CTW research was done was a £1,000 hard disk system so 12% is excellent!

Please note that Falcon is being stocked in over 80% of independent UK music stores! Some 'failure' eh? We are delighted with Falcon's performance so far and believe this machine has a big future.

So, to sum up, **Edge** shows potential, but, like 3DO and any other new kid on the block, respect for the elders of the tribe is essential if you are not to get your ear clipped from time to time. Talk to us, we are past present and future in one happy package!!

Darryl Still
Marketing Manager,
Atari UK

If Edge has been guilty of applauding 3DO to the detriment of established companies like Atari and Commodore, why have we received letters telling us not to be so negative about it?

The 3DO feature in **Edge** one was a far call from the sycophantic approach videogame magazines usually adopt, and unearthed just as much dirt about the company's hype and promotion of 3DO as anything else. If Trip Hawkins fails to find a market for his 3DO machine you won't see any red faces around here. E

'After reading 30 pages of techview my own 'Direct Memory Access Engine' was proving to be a few megabytes short of requirement...'

Danny Somers, Wetherby

'The reviews section seems a bit pointless, as most people will buy a magazine that deals with their own machine for games reviews.'

Ross Davidson, Southampton

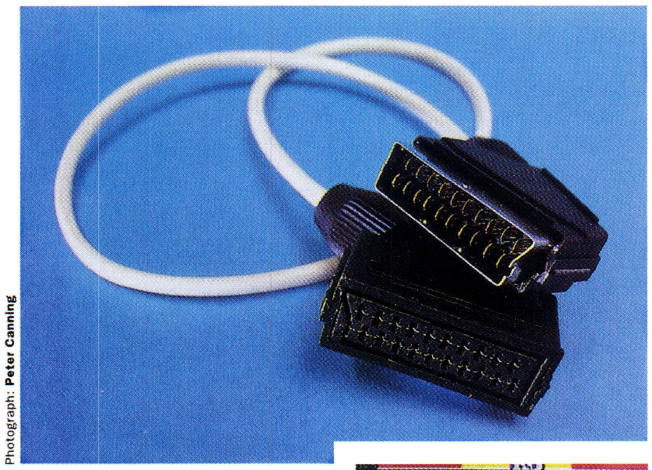
'Concentrate on the future, inside information, and so on. Anyone can review games...'

Dave Thyer, Bristol

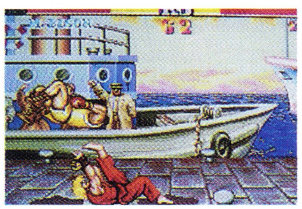
'Continue to focus heavily on the CD hardware as this is where the market is going.'

Nik Smith, Hornchurch

Do you have a question, technical or otherwise, about videogames or games hardware? If so, get in touch, **Edge** has all the answers...



Photograph: **Peter Canning**



The PC Engine Colour Booster (top) gives a clear display, as shown in this shot from PC-E *Street Fighter II CE* (above)

Q You seem to have got excellent quality pictures of the PC Engine games in **Edge** one. How have you managed this, because on mine the screen display always looks murky and dull?

Robert Smith, Cardiff

A What you need is a Colour Booster. This is a SCART cable with built-in picture-enhancing circuitry, which you should be able to get from anywhere that sells imported PC Engine gear. It costs £15-£25. The problem is that the Engine is not designed for an RGB display signal, and no-one has yet found a way of converting it internally.

Q What's MPEG and how does it function?

Murray Middleton

A MPEG stands for the Motion Picture Expert Group. This is a research body set up by all the major electronics firms to devise a standard for digital video.

The problem with digital video, where each frame of video is stored as data, is that it needs fifty frames to be supplied to the TV every second and a CD can not supply data quickly enough. The answer is to compress the data and use chips to decompress it before it is displayed. The compression technique involves storing just the changes from one frame to the next, rather than the whole of every frame.

The MPEG 1 standard is a set of chips which does this compression and decompression, and the chipset can be bought by any manufacturer that wishes to use it. MPEG 1 will be known as VideoCD when it goes on sale. The chips were finished in April this year and are expected to go onsale first as addons for Amiga CD^{32} and Philips CD-i. Similar addons will also be available for any CD audio player that has the right kind of output.

Q In **Edge** one you said that it will be possible to actually watch films from a Philips CD-i machine using the FMV upgrade cartridge, but standard CDs can only hold about 70 minutes of film. Would you have to purchase two CDs to watch one film, and would this make it more expensive?

David Magni, Farnborough

A Yes, films will come on two CDs sold as a pack. We don't have a definite price yet, but the best guesses reckon about the price of a double CD album, £16 or so. Philips Interactive Media have already agreed the release of a total of 50 films by Christmas, but of course these will also run on any MPEG 1-equipped CD machine.

Q I understand that if I converted my UK Super NES to 60Hz, it would run at full speed with no borders, reproducing the same quality display as a SCART system. Is that right? In other words, can a PAL system be converted so that it can reproduce a SCART system? If I used my UK SNES with a Philips CM8833II monitor, will the graphics be in the same league as a SCART machine on a SCART TV?

Ken Ng, Tooting

A You're mixing up two different things. First of all, NTSC is the American and Japanese TV system, (60 frames per second), while PAL is the European system, running at a slower 50 frames per second. The idea of converting your SNES is that it speeds it up and takes out a slightly botched-up system of conversion to PAL, but it really doesn't make a big difference.

SCART is just a standard TV connector. The main advantage of a SCART connector is that it can supply an RGB signal, composed of separate red, green and blue information. Other connector use a composite signal, which mixes up the red, green and blue and so gives slightly less quality.

A monitor will always give a better picture than a TV, because monitors have a higher screen resolution and a faster refresh rate (50Hz).

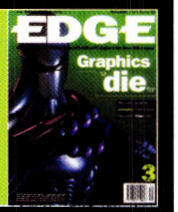
Q and A

Most gamers, at one time or another, have come across a technical problem that they can't solve, or a pressing query with no-one to answer it. This is where Edge comes in...

Simply jot your problem down and send it to: Q&A, Edge, 30 Monmouth Street, Bath, Avon BA1 2BW. Alternatively, fax us on 0225 446019, or e-mail us via astorer@cix.compulink.co.uk.

Edge will do all it can to provide a solution in the next issue of the magazine.

Sorry, we can't answer queries over the phone and personal replies are not possible – even if you do enclosed an sae.



Despite a dev-partner list boasting the likes of Retour 2048 and Trimark Interactive, and the very existence of *Trevor McFur In Crescent Galaxy*, 'hopes for [Atari's Jaguar] remain high' in issue three. Meanwhile, the Bad Press column shows that, even in these pre-*Bully* times, gaming is the root of so many evils.

Jaguar gets set to pounce

JAGUAR

it is...

David Braben, the man behind *Elite*, *Zarch (Virus)*, and now *Elite II*. *Elite* sold 750,000 copies on all formats, making it one of the biggest selling games of all time. Edge gives his new creation, the sequel to *Elite*, the Prescreen treatment on page 26

The Jaguar story rolls on with Atari announcing its first batch of licencees. There are still some 'major licencees' to be announced – including heavyweights like Virgin, Gremlin, Accolade and Acclaim. But more news on this next issue...

Atari UK are also in favour of having a shipout of 5,000 Jaguar machines before Christmas in the UK. The decision whether this will actually happen or not rests with Atari's US headquarters. The American launch of Jaguar will happen in early November in New York.

The hardware

Edge was invited down to Atari's HQ in Slough for a preview of the new 64bit Jaguar. The machine itself is a nice looking piece of kit – slightly overdesigned perhaps, but well made and solid. The case is a slick matt-black affair with heavily embossed red Jaguar logo – no mere cheap paint job, this.

Sadly, the same cannot be said about the joypad, which feels cheap and very tacky. The suspiciously lightweight shiny black unit isn't terribly comfortable to hold – not surprising, considering the 12-button pad in tow – and both control pad and fire buttons were spongy and unresponsive.

The software

At the heart of any new system is its software. The 3DO Multiplayer rolled out with the excellent *Crash 'n Burn* (but little else) – so what can eager would-be Jaguar owners expect to be playing?

Cybermorph

This game is a cross between *Virus* and *Starfox* and while it sounds the most promising of all the Jaguar's games on paper, it could be a major disappointment. The 3D vector graphic landscape is projected only into the middle distance, as if you are flying over a tabletop which is continually being contoured. And you have react very quickly, as enemy ships and buildings appear suddenly rather than gliding into view.

But *Cybermorph* does go some way to showing what the Jaguar can do. It shifts a *load* of lightsourced polygons realtime.

Aliens Vs Predator

Possibly the most visually impressive of the group, *Aliens Vs Predator* is a slick firstperson perspective shoot 'em up set inside a colonial complex – just like Aliens, in fact. Here, the player gets to race around shooting aliens, predators or even your own colonial marines if you feel so disposed.

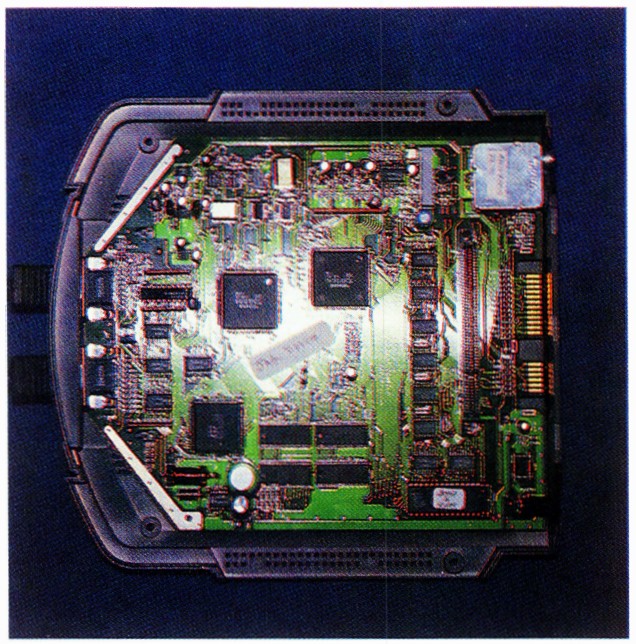
The scrolling 3D hallways and corridors are smooth and detailed using texture mapping. But it's no more than owners of a 486DX would expect. The saving grace is the fully animated, scaled and depth-cued baddies: when they're in place and moving well, it could be a whole new ballgame.

Tempest 2000

This early version of *Tempest 2000* is a direct conversion of the original coin-op, although the programmer, Jeff Minter, intends having two versions on the cart, one with filled polygons. Playability-wise, this is best of the bunch, although it too was slightly marred by a piercing death-scream that went on far too long. At least it really makes you dread losing a life.

Checkered Flag II

In great Atari tradition, one of the first Jaguar games is a road racer based on their classic coin-op. *Checkered Flag II* is →



The belly of the beast. The two black squares in the middle are Tom and Jerry – a 64bit graphics and 32bit sound processor, respectively

Among the Jaguar's opening salvo of games are *Checkered Flag II* (top) a fast, polygon-based F1 simulator. And *Cybermorph* (bottom), a fast polygon-based combat simulator. If nothing else, at least it proves that the Jaguar sure can handle those polygons...

Continued

EA back on the Nintendo cart trail

Following the report in Edge two about EA's decision to drop the SNES, Nintendo have stepped in with a new cartridge pricing policy.

To ease the burden on thirdparty licencees, Nintendo will now allow publishers to purchase base cartridges in dollars rather than yen. This will result in considerable savings for licencees, better profit margins and, hopefully, lower RRPs in time for Christmas sales.

Before the announcement, thirdparty SNES titles were suffering from inflated prices, giving Mega Drive titles an advantage of up to £10, also forcing high megabit titles into the stratospheric £60 region.

In response to the move, Electronic Arts has said that it is ready to start thinking about releasing Nintendo products again. But the first units won't appear until early next year.

First Jaguar developers announced

So, here's that list of software developers working on games for the Jaguar. Not quite as many as Trip Hawkin's 350 'devoted' thirdparty developers, but maybe some of these Jaguar licencees will use their developer's machines as more than just paperweights, eh?

Anco Software
Beyond Games
Dimension Technologies
Eurosoft
High Voltage Software
Krisalis Software
Loriciel SA
Maxis Software
Microids
Midnight Software
Ocean Software
Rebellion Software
Retour 2048
Silmarils
Telegames
Tiertex
Titus
Tradewest
Trimark Interactive
US Gold

← something of a quantum leap over its inspiration, though. The graphics are made entirely of polygons, *Virtua Racing*-style.

Again, this was a very early demo, and so while it's unfair to pass any major judgement, it did look basic – not up to the best PC racers – and the car was decidedly uncontrollable.

Of course, just how much gamers actually *need* another Formula One simulator is another matter altogether...

Trevor McFurr In Crescent Galaxy

And finally we come to Trev and his space shoot 'em up. Now much as we realise that it's early days, and programmers need time to get to grips with the Jaguar's 64bit architecture etc, this has to be the most dismal piece of software **Edge** has seen for a long time.

At best, it's a colourful horizontally scrolling shooter, with cleverly animated bosses. At worst, it is an ill-conceived, poorly designed, badly implemented and utterly random blaster with almost no redeeming features.

The scenery is moderately pretty at times; although believable – if indeed any – parallax seems beyond the capabilities of 64bit processing. Enemies attack, not so much in waves, as in random clusters. And the only thing that seems to connect the game together is that the stars of the show are humanoid animals – hence the Trev of the title – whose photorealistic images are made up of army officers' bodies with animals' heads 'glued' on. Laugh? We nearly started... If there is only one cart available when Jaguar launches, and this is it, please don't buy it.

So, all in all, something of a mixed bag. All still have plenty of work to be done on them (one actually needs restarting from scratch) and hopes for the machine remain high. **E**

Bad press

The media continues to fall over itself in its concern over videogaming. Epilepsy? Antisocial behaviour? That's the least of it...

Er, 'sorry, Sega'

A fine example of newspaper journalism entirely freed from the fetters of research and validity appeared in the holier than thou Independent on Sunday in early September. 'Sega games cause eye damage', it boldly proclaimed, referring to Sega's Virtual Reality project. Well, it is possible that VR headsets can damage eyesight, but the fact that Sega's VR games are still in research – none are yet on the market, rather scuppered the IoS' article.

Sega's lawyers got on the case and allegedly gave the Indie hacks a real kicking. An apology appeared in the Independent on Sunday on October 3rd. 'We apologise for the embarrassment caused (whose?)', it proclaimed – not quite so boldly this time.

source: Independent on Sunday, 5/9/93, 3/10/93

And 'Thanks, Dad'...

Under the heading 'Boffins have got it wrong – Dad zaps videogame findings' we learn about the father of Mike Kenneally, who claims that researchers into epilepsy 'have got it wrong'. His claims are based on the fact that his son wasn't tired, but had a fit after playing 'that Super Mario TV game'.

'Dozens of similar cases' came to light nationwide 'after the South Wales Echo revealed the link between computer games and epilepsy' in January, the paper claims.

source: South Wales Echo, 24/9/93

Books are 'boring' – shock

'Square eyed youngsters in the North are shunning their books in favour of... playing computer games', complains the Shields Gazette. 'Nearly half of all the children questioned... said they found books boring', the article continues. The question was asked as part of a survey carried out by food giant Bird's Eye. And we can reveal exclusively that nearly half of the staff on **Edge** sometimes eat fish fingers, or other types of fish. Must be all that gaming, eh?.

source: Shields Gazette, 31/8/93

Mortal Kombat – art?

Late night arts chat show, The Late Show, got slightly out its depth when it invited celebrated gore novelist Will Self to review the 'virtual reality game' *Mortal Kombat*. And Will's reaction? Just a laconic thumbs down for Acclaim's VR masterpiece.

source: The Late Show, 27/9/93

i wish...

David Jones

'... that the software industry decided on one single powerful platform that could become the standard for videogames. If this happened it would allow developers to concentrate more on game design – without constantly having to hold back their ideas to fit the game onto all the different platforms.

'Just imagine, if we could devote all our resources onto producing one game per year, that game would be of outstanding quality, with an enormous richness of gameplay. Basically, we have far too many platforms in the market, with too many low quality games at high prices. A single hardware market would give gamesplayers higher quality games at a lower cost.

'Of course, the hardware would have to be upward compatible, to ensure that exciting new features could be added to the machine every year or so, but still allowing all older games to play.

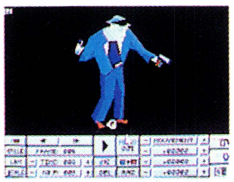
'One day...'

David Jones is a top programmer at DMA Design in Dundee. He has designed and programmed some cult-status videogames, including *Lemmings*, *Lemmings 2* and *Walker*... DMA were also responsible for *Blood Money* on the ST and Amiga.

Cinematically styled static viewpoints, male and female playable characters, a mysterious plot, puzzles to solve, and lumbering zombies lining up to be blown away to the accompaniment of lashings of blood: French publisher Infogrames may be on to something with the distinctive *Alone In The Dark* series...

Alone In The Dark 2

A sequel to the excellent *Alone In The Dark*, was inevitable. **Edge** reports on Infogrames' new improved action RPG



Each character in *AITD2* moves in a preordained fashion as defined by the animator (top). Here a gun-toting sailor strides after you, firing his pistols and then spinning them into the air before catching them and firing again

At the start of the game, supernatural sleuth Edward Carnby has to blast his way past some of One Eyed Jack's zombies. The deceased undead are spirited away (inset)

Format: **PC/PC-CD ROM**
Publisher: **Infogrames**
Developer: **In-house**
Release date: **01/94**
Size: **8 Disks/1 CD**
Origin: **France**

One of last year's visual jaw-droppers was Infogrames' *Alone In the Dark*. Using 3D vector graphics, and with cinema-style cuts from scene to scene, *AITD* won a slew of important industry awards.

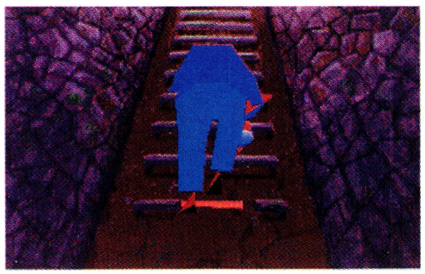
Eighteen months on, and the inevitable sequel has arrived. But, thankfully, unlike the film industry most videogame sequels are better than their predecessors – and *AITD2* is no exception. The main complaints levelled at the original were that it was small, easy to finish and that the main character was tricky to control. *Alone In The Dark 2* has pretty much solved all those problems: it's four times bigger, contains more complex puzzles and has a main character who now moves three times more quickly.

In *AITD2* Edward Carnby reprises his role of supernatural private eye, as he attempts to track down the whereabouts of his PI friend Ted

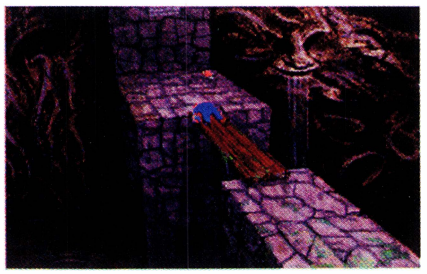
Ed gets a thorough pasting at the hands of two maniacal zombies

1 To show how *AITD2*'s camera system works, here's a sequence showing Ed Carnby discovering his old friend, Ted Sticker...

2 Climbing down a ladder, Ed steps on the rusty rung, which snaps off and sends him hurtling to the ground



3 Ed tumbles across the floor, coming to rest on a walkway. In a daze, he accidentally knocks his machine gun over the side



In a scene stolen from Jean Cocteau's Beauty And The Beast, Santa Cranby battles with spectral wall-mounted sword-waving arms

In the kitchen, Ed comes across a chef armed with blow-pipe. Superb animation, but it's dangerous to sit around and watch

One thing that *Alone In The Dark 2* doesn't do is pull punches. Every slap, headbutt and bullet hit is accompanied by horribly realistic sound effect and a shower of blood. Good job it's just makebelieve...

Sticker. Sticker went missing during his investigation of the kidnap of Grace Saunders, an eight yearold girl. Prime suspects are One Eyed Jack and his band of bootleggers.

Set on Christmas eve, this game is a bit of a Santa Claus meets The Krypton Factor meets Dawn Of The Dead, with a besuited hero solving puzzles and destroying zombies in a variety of grisly ways.

As well as wielding machines guns, swords and other inanimate objects (both backhand and forehand), Edward kicks and punches and also performs a mean headbutt. There's plenty of blood and it's definitely not a game for the fainthearted.

With 250 backgrounds and 80 different characters, there's around 50 hours of playing time in *AITD2*. Backgrounds now feature 2D animations to more convincingly set the scene and the camera system has been refined so that in larger rooms you have several different angles, depending upon where your character is standing. And just as you could choose to play as a man or woman in *AITD*, the sequel has the player in control of both Edward and, upon his capture, Grace – whose size means she can perform tasks that Ed could not.

Certainly the animation of all the characters is very impressive, and the camera cuts should make playing *AITD2* a very unique experience.

Jack In The Dark is a small two-room puzzle that comes as an extra bonus for anyone buying *Alone In The Dark 2* on CD-ROM or floppy, or the original, which is being repackaged for a Christmas re-release.

This minigame has a yuletide theme. Santa has been captured by an evil Jack In the Box and you control a girl tasked with releasing the chubby yo-ho-ho merchant. As freebies go, *Jack In The Dark* is great.

E

Credits

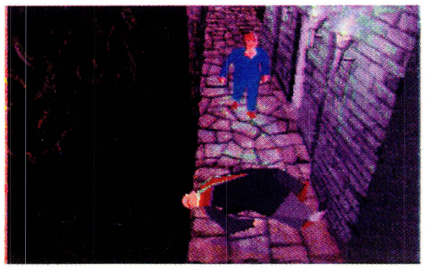
Programmer: Franck de Girolami
Programmer: Vincent Terraillon
Graphics: Frederique Nantermet
Graphics: Sylvie Silvi
Animation: Jean-Marie Nazaret
Animation: Frederique Bourgin
Music: Jean-Luc Escalant

AITD2 is a bit of a Santa Claus meets The Krypton Factor meets Dawn Of The Dead...

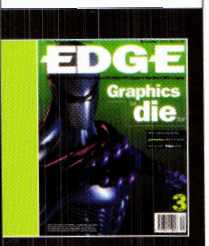
Every character crumples realistically to the ground before dying

4 Crossing the chasm, Ed spots a shape at the far end of the dimly lit walkway. Plucking up courage, he decides to investigate

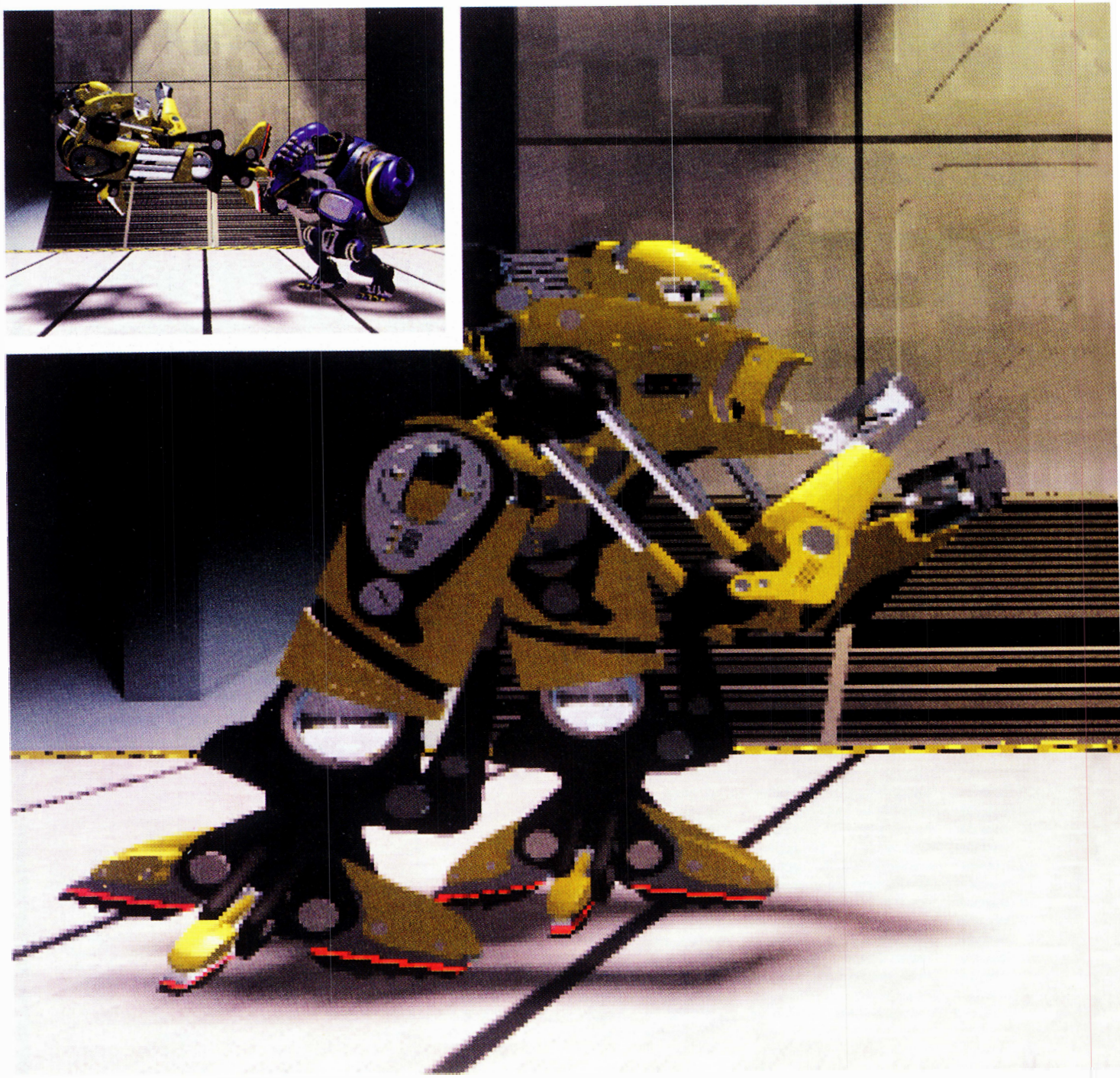
5 As he nears the shape, Ed recognises his old friend and private eye, Ted Sticker. Ted appears to be having a crafty kip



6 But on closer inspection it appears that Ted's sleuthing days have come to an end. Guess you can forget that £20 you owe him...



With backdrops created by a professional interior designer, a constantly updating collision table that's taken two months to design, and fighter shadows that take up half a megabyte of memory each, what isn't to like about cover star *Rise Of The Robots*? Of course, it'd be good to get a chance to properly *play* it.



Rise of the Robots

Rise Of The Robots is Mirage's stunning new PC and Amiga beat 'em up, also destined to grace Mega Drive and SNES screens. Is this just another *Street Fighter* clone, or really the one to take the beat 'em up into the next generation? **Edge** reports

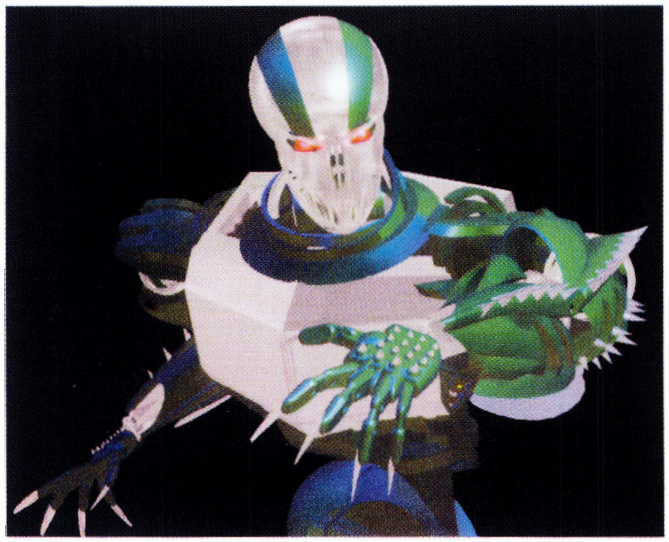
Mirage's new in-house development team – Instinct Design – are boldly attempting to take the beat 'em up genre a stage further. And their effort, *Rise Of The Robots*, looks set to grab the software industry by the scruff of its neck and give it a good old shake.

Ex-Bitmap Brother **Sean Griffiths** leads a team of five coders working on *Rise Of The Robots*. He's confident that the product will be highly regarded for many reasons: 'It's not a conventional beat 'em up. We're using robots that fight and act unusually, with a very high level of artificial intelligence that has never been seen

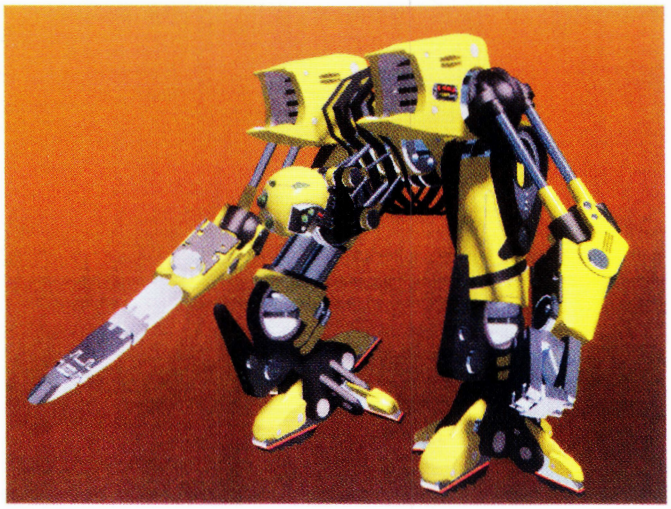
continued next page

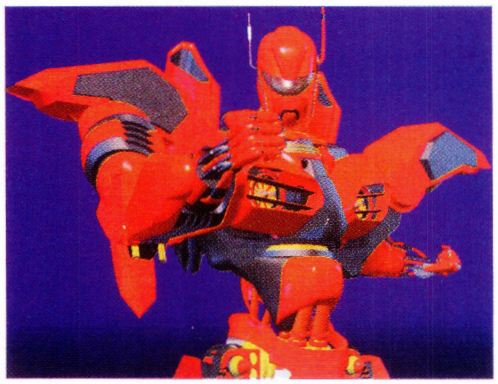
Rise Of The Robots: the characters

Rise Of The Robots plays host to some of the most brilliantly designed characters ever to appear in a beat 'em up. Each of the metallic combatants has its own distinct style of fighting and a series of special moves. In twoplayer mode you choose any character you like (except the Supervisor) but there's no same character vs character option. Maybe this has been left out for a *Champion Edition*, eh?

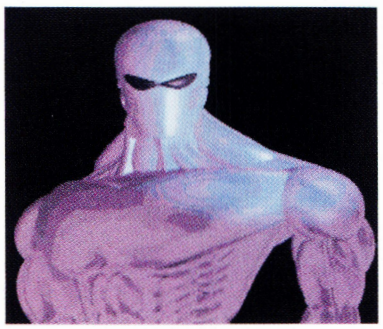


This faceless character is the Cyborg you control in one player mode (below). Half man, half machine, he was the most difficult of all the robots to create because of his sculptured physique. To start with he looked rather like Robocop, but he soon took on his own personality. The Soldier (bottom) has been a top secret project at Electrocorp, and he's purely a war machine

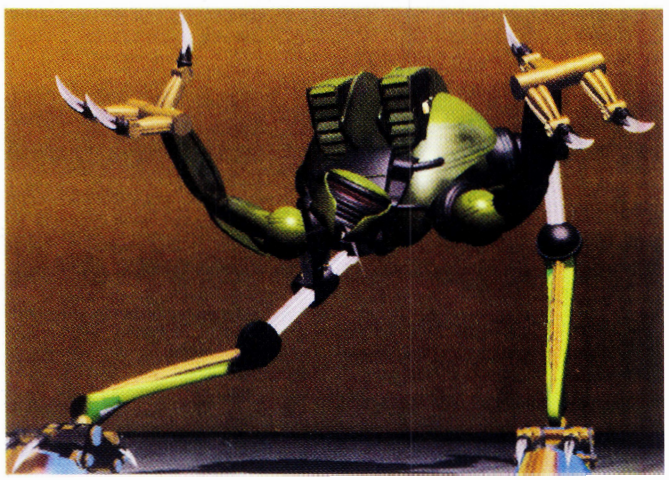




This Combat droid was built just for unarmed encounters (below). It uses traditional fighting moves which comes as no surprise – it was designed by the Japanese division of Electrocorp. The loader (bottom) was the first robot, but it still packs a hefty punch



Built from a new kind of metal, polymetamorphic titanium alloy, the Supervisor (below) is most definitely a one-off droid. It's a product of the Electrocorp research and development division and has some very unusual attributes. By adjusting the flow of electrical charge it can change its shape and mould into any form – as though it were liquid. Special moves include melting to avoid punches and forming anvils and spikes for hands



Used to carry heavy robotic parts the BHF03 Builder (above) is a slow mover. But it does have powerful arms with a great deal of flexibility. The Crusher droid (right) towers over all the other robots. Its arms are so long it can hold struggling droids while dismembering them with its pinchers...

Photograph: **Adrian Ford**

Kwan Lee, the man behind the interior scenes in *Rise Of The Robots*, was recruited – in spite of his lack of experience of *3D Studio* – because of his professional interior design skills...

before. We'll definitely have one over on *Street Fighter II*.

'It's inevitable that people are going to compare any one-on-one beat 'em up to *Street Fighter II*, but after people see *Rise* they will see it's nothing like *Street Fighter*.'

True, it 'looks' nothing like *Street Fighter*, and if graphics alone could sell a game *Rise* would sell by the bucketload – the fully rendered visuals are simply breathtaking. Autodesk's *3D studio* was used to do everything – and it shows. The initial game design was based around two robots fighting and it didn't use rendered images. Sean and team were really concentrating on making the opponents hard to beat, using artificial intelligence to make interesting fights. Then they came upon rendered technology. So they just put the two together.

The game has a very cinematic look to it. In between fights a fully animated sequence sets up the next part of the story. According to Sean, that was also part of his original concept. 'I wanted to do an interactive movie type game, but I wanted to make a good game out of it, as opposed to having brilliant images and a dire game.'

The design of the robots was left to the relatively inexperienced **Sean Naden**. Griffiths wanted someone who'd have a totally fresh outlook to this kind of work

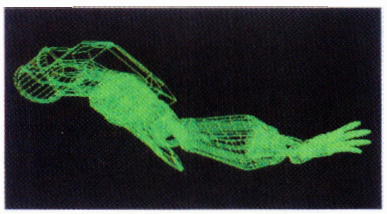
Photograph: **Adrian Ford**

Sean Griffiths, ex-member of the Bitmap Brothers, headed the team of five programmers working on *Rise Of The Robots*

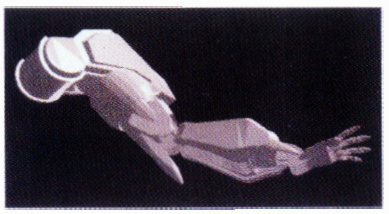
'It's not a conventional beat 'em up. We're using a lot of artificial intelligence... We'll definitely have one over on *Street Fighter II*'

Sean Griffiths. Designer

Robotic rendering



Step One: To create the robots and different parts of the anatomy Sean first had to create a 'mesh'. This is built up from hundreds of circles and spheres which are stretched to create the desired shape. After their construction, Sean can begin working out the animation routine.



Step Two: The next stage is the building stage. The surface is coloured to create a true 3D image. The rendered graphic now starts to take shape but, according to Sean, the finished rendered image looked 'too clean' so, the image went through a final texture mapping stage.

Step Three: Detailing the rendered image was the next step. Sean created a 2D texture map and added colour and detail in order to make the robots look less perfect. This texture map was then wrapped around the model in a variety of ways to create the finished limb.

Step Four: And here he is, the finished Fighter in all his rendered glory. Now all that's left to do is to animate him...

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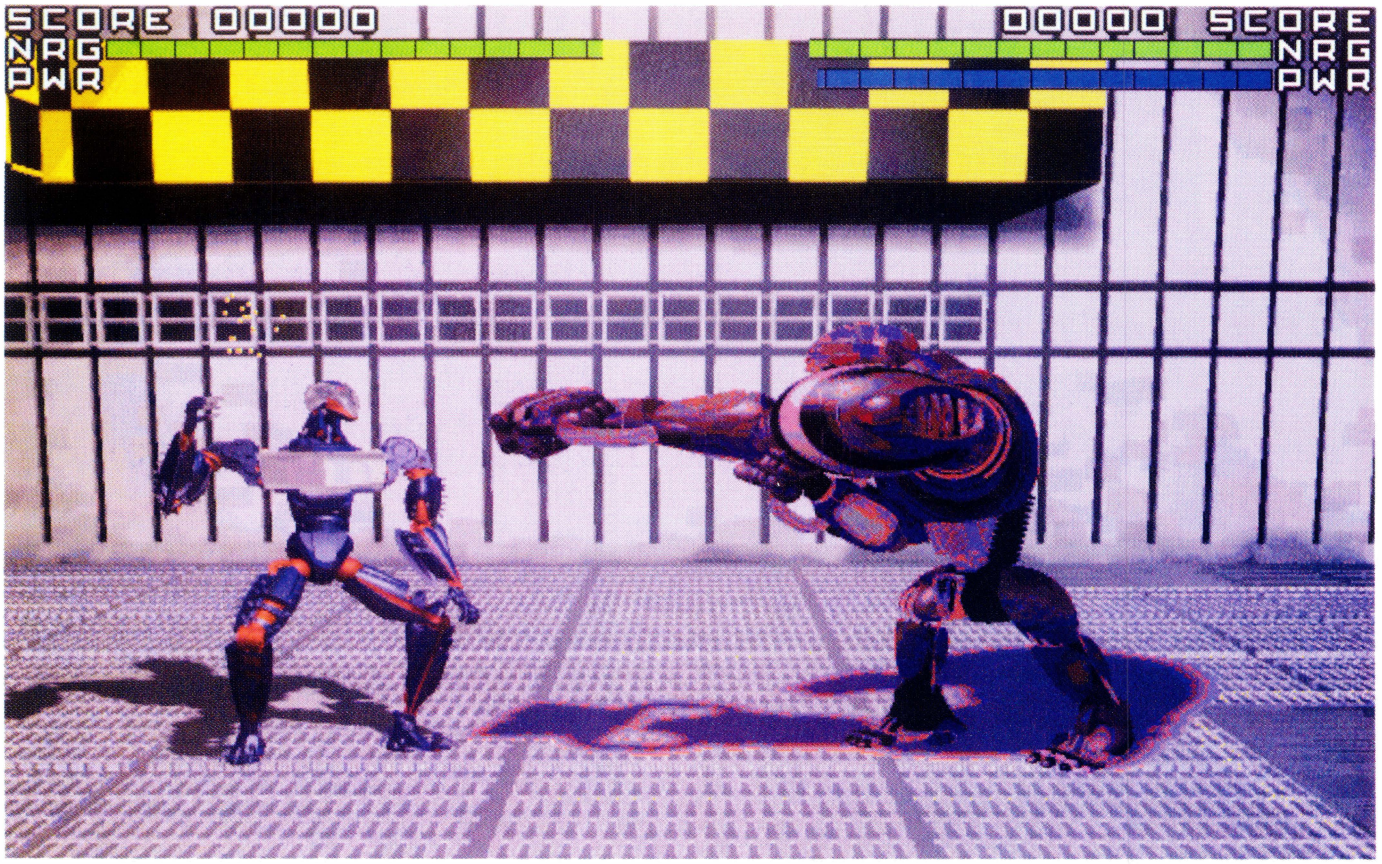
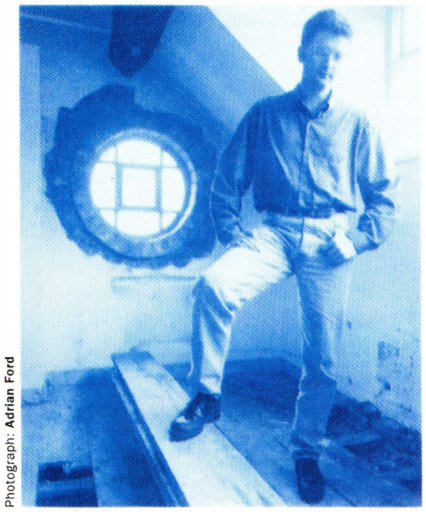


So much work went into rendering the robots and implementing them, that an unusual stance for all the robots was a must to ensure that all the graphics would be seen. Notice how the Cyborg (above) stands side on, but yet all his body is still visible. The shadow effect is very impressive but unfortunately it may have to be lost in the final version due to memory restrictions. Each robot is hoped to have 100 frames of animation to complete the 'real' look

and not have any preconceived ideas. Naden optimistically responded to an add in the local job centre and got an interview. Griffiths sent him away for the weekend with a simple brief: design some kickass robots. Naden's ideas appeared to be on the save wavelength as Griffiths, and he was duly welcomed onto the team.

Naden started creating the robots in conjunction with Griffiths. All the robots began their life as a 'mesh' frame which was created using spheres and tubes. Certain bits then had to be cut up, rescaled and stretched to create the desired look. The Cyborg is the most complex because of his muscular physical appearance – the other final robots aren't as contoured because they're more automated. Naden studied muscle magazines in order to create the Cyborg's believable anatomy.

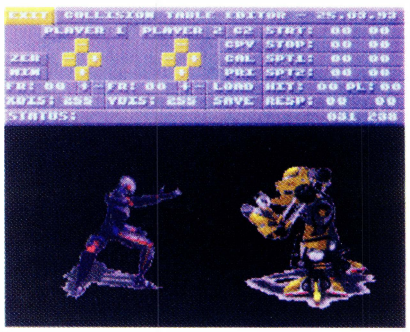
In creating the robots, Sean explains, the team ran into a few problems, 'We found that as we were building the robots they appeared too perfect – rendered images are too clean. We wanted to create a real world, so the next stage was to texture-map the objects. We took a texture map and added colour and detail, and then stretched it around the shape to give it that extra level of detail.'



Photograph: **Adrian Ford**

Sean Naden, co-designer with Sean Griffiths of all the robots. He got the job from an ad in the local job centre...

'As we were building the robots, we found that they appeared too perfect... so the next stage was to texture map them all' Sean Naden, 3D Modeller



Tables detailing every characteristic ensure that each of the robots knows how to fight. Here the data is being collated into a table

The graphics in *Rise* may look impressive, but the game is also a bit of a mover. In the final version each robot is expected to have up to 100 frames of animation, and a key frame system has been used to ensure the fluidity of movement.

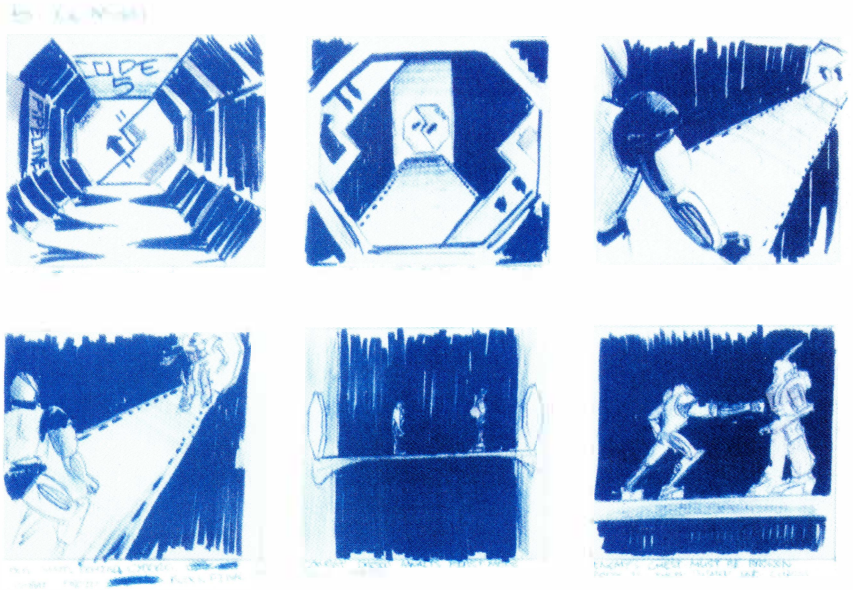
This is a very simple yet very effective way of bringing rendered images to life. A frame is drawn at the start of a certain movement, for example a punch, and another frame at the end. The computer then interpolates the frames, giving a full action movement. The smoothness of the

image can be adjusted by adding frames in between the two points. Sean explains, 'We were looking for 10 frames for each movement, but it's really five frames forward, and the same five frames backwards to make it look smooth.' A similar technique was used to create the animated cut scenes, which are full of swooping camera angles.

The actual robots take up so much memory that the images have to be constantly cut up as sprites, squashed up and packed down. Each robot for the PC version will take up to 1·5 meg of memory – this has been drastically cut down to only 200K for the Amiga version, but the images still remain impressive.

PC programmer and martial arts expert **Gary Leach** was called in to perfect the robot fighting movements. His martial arts experience proved vital in detailing certain moves. For example, he'd say that more snap was required in a particular punch or more hip movement was needed when delivering certain kicks. But however much they studied real-life fighting it couldn't always be converted for figures with hydraulic legs and arms.

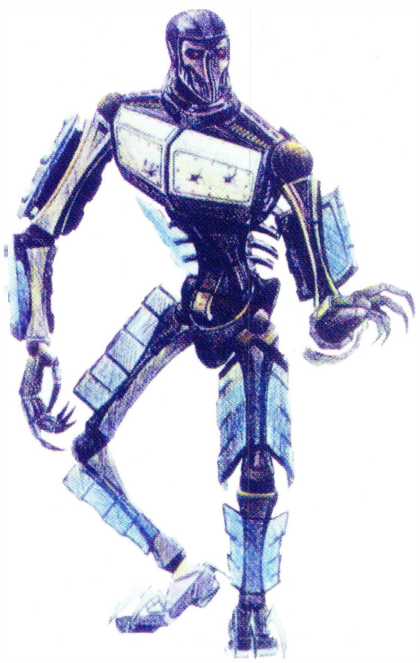
It took two months to fully render and animate a robot, and an unusual viewpoint was used for all the figures. According to Sean, 'We spent such a long time building the robots that we've had to go for an unusual angle so the player gets to see the whole robot. We used a 'grey screen' technique which is similar to blue screen for films, so we were able to generate a synthetic actor, cut him out and then paste him on the background.'



Both Seans (Griffiths and Naden) got together to design the scenarios for the game. An extract (above) from a page of the storyboard shows the Cyborg preparing for his next battle

The backgrounds were also designed to be a big part of the game, and the Instinct crew took on a pro to help them out with them. **Kwan Lee**, a freelance interior designer, responded to an advertisement for a graphics artist. Kwan eventually convinced Sean that he needed a professional interior designer to design the rooms. It sounds obvious doesn't it: if you want good room design, why not get a professional room designer?

Kwan's involvement with the game was his idea of a dream come true, because for the first time he had no set limits. No budgetary limits, no room dimension limits, nothing. In fact the only limitation, was his own imagination. According to Kwan, 'The whole game will be set inside a single building. A robot must be tackled on each floor and the higher you get the cleaner and more hightech the rooms become.'



Naden sketched many ideas for robots. Some were ditched, but this soldier (above) was implemented in the game. The finished image (above right) is fairly faithful to the original idea

Photograph: **Adrian Ford**

Gary Leach, himself a martial arts expert, perfected the robots' fighting movements

Playability is the one elusive, yet totally vital element missed by so many of these graphically outstanding games. **Andy Clark** was the programmer responsible for teaching the robots to fight: 'We spent nearly two months designing a collision table – it uses a system of coordinates with

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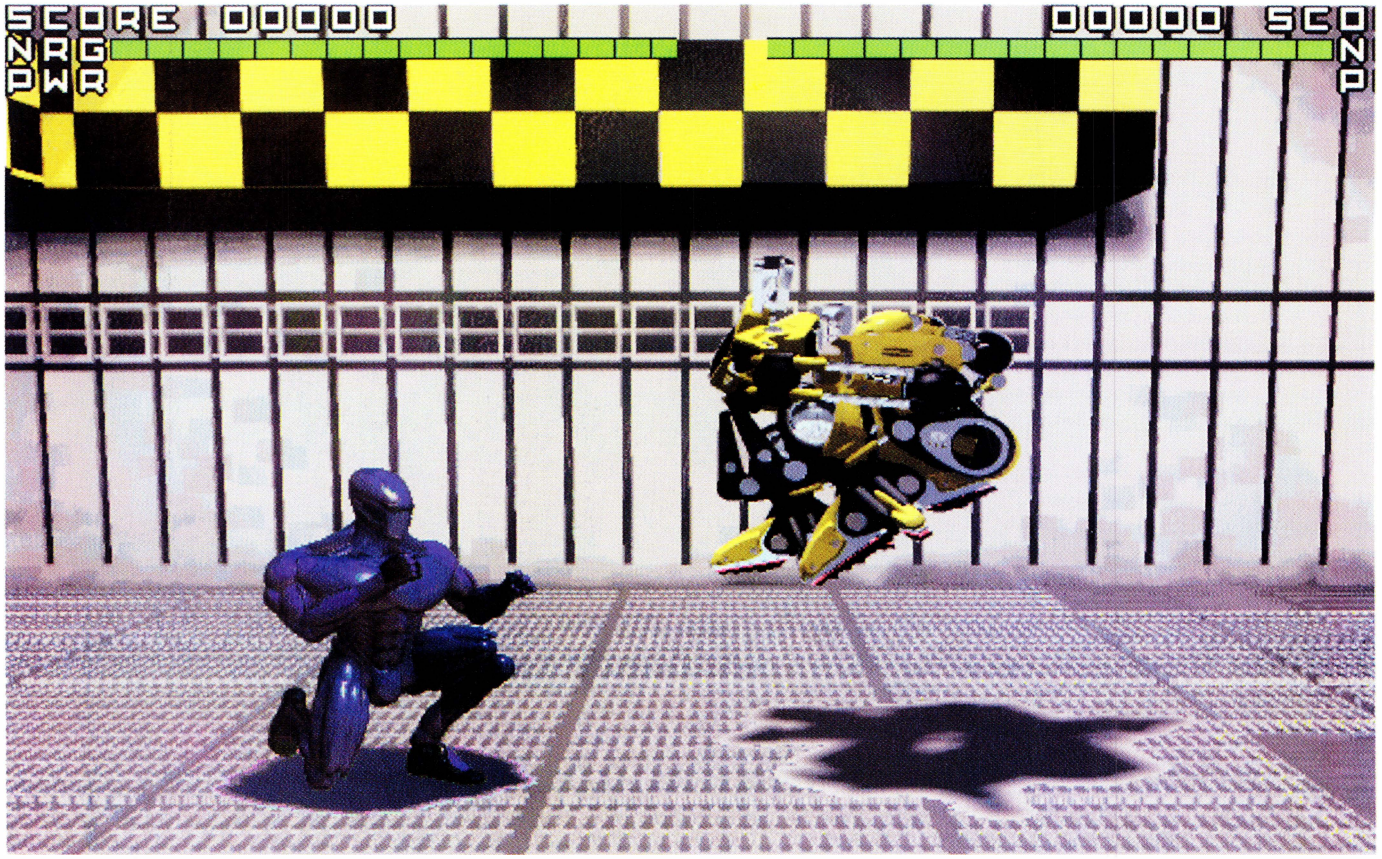


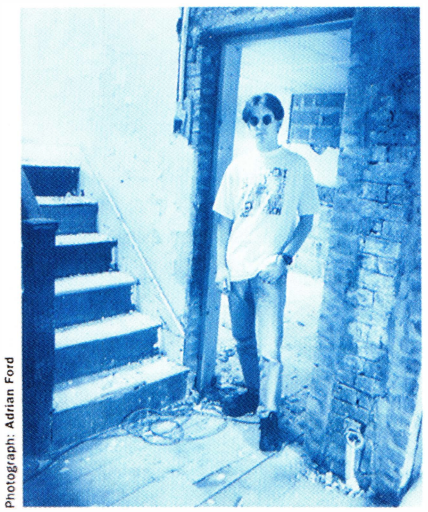
***Rise*'s biggest downfall could be the way it plays. The major concern centres around the fact that PC owners usually only have one button on their joysticks. And the console versions will use the same one button system as the PC, even though those machines have more buttons. However, all the special moves will be accessed through tricky combinations of joystick movements, and if it's implemented well enough, this shouldn't detract from the game**

contact and collision points.' But gameplay in *Rise Of The Robots* has another big asset: Artificial Intelligence.

The intelligence is all based around the various attributes of the robots. Strength, intelligence, speed, and motivation alter the behaviour of the robot on the screen. 'We basically set up a huge table of responses to opposing moves, so the player, by using his robot's intelligence and motivation, selects the best response to the opponent's current move. Things like speed and strength are also factors, determining how much energy is used. Each bout will be different because all these factors are constantly updating', Andy explains.

Other table generators look at which moves you particularly like using and the moves you find easiest to get a contact with. With other beat 'em ups, if you found you were successful with a footsweep, you could continue to use it. But this system actually tots up all the statistics in the background for particular moves, and if you get good at a footsweep, then your opponent will act more aggressively towards that move – it will block it more or jump out of the way and counter attack.

Other factors like success rate and aggression are also taken into account. The success rate calculates how many moves have made contact and how many blocks have been successful. The aggression factor is also quite unique. Attacking moves have a positive number and defensive moves have a negative number. All these are then added up over a period of time to give a rough account of how aggressive the opponent currently is, which again affects



Photograph: Adrian Ford

Programmer Andy Clark was the man behind the complex gameplay in *Rise Of The Robots*. It uses a series of specialised data tables

'We spent two months designing the collision table... Each bout will be different because it's all constantly updating'

Andy Clark,
Amiga Programmer

This is the original design for the Supervisor – the last robot you face on the Electrocorp site

the robot's response to your moves.

The motivation factor is calculated from all these. If the robot is on the defence, it will have low motivation, but if it's attacking, motivation will be high – the higher the motivation the stronger he becomes.

Apart from jumping around the office karate chopping everything in sight, Gary Leach did have another role in the development of *Rise Of The Robots*. Gary took the 'AI' tables from the Amiga and ported them directly to the PC. 'Andy had done the hard part, so porting over the tables was quite easy. What wasn't quite so easy was the screen flickering we got because of the resolution. *The 7th Guest* used the same resolution but the programmers didn't use 'page flipping' to get rid of that flicker. If you had a slow machine it looked quite bad, and on *Rise* it would definitely look flickery if I hadn't used this technology. So I came up with the page flipping technique, which I haven't seen done on a PC before. Unfortunately, we'll have to lose the shadows in the final version. They are a nice touch but some of them take up half a meg, so if we can fit them in we will.'

Photograph: Adrian Ford

There was a five-man design team behind *Rise Of The Robots*. From the right, they are: Andy Clark, Sean Naden, Kwan Lee, Sean Griffiths, and lastly the team's martial arts expert, Gary Leach

***Rise* is** one of those games that barely needs a plot, but it has one anyway. Metropolis 4 is a city of the future, and is run almost entirely by robots. The Electrocorp building is where all the military and industrial robots that drive the city are manufactured. But it all goes wrong. The main robot in charge of all production – appropriately called the 'Supervisor' – is affected by an severe ego virus and he turns violent. So, the company sends in a Cyborg to deal with the matter.

Rise Of The Robots has a few surprises in store when you defeat the final robot. He'll either explode into thousands of pieces (very impressive) or, explode into thousands of pieces only to reform and kill you. Sean hasn't decided what will trigger off the perfect ending just yet, but he's hinted on the possibility of a certain finishing move...

The game is already about 70% complete, and versions for the Mega Drive and SNES are also planned. Sean did say that he would like more time to test the game. '*Street Fighter II* was tested for a year, I'd like to have that sort of time with *Rise*.'

Whether the game will live up to its name and rise above other beat 'em ups remains to be seen, but Mirage's PR manager, **Julia Coombs** is quick to defend *Rise* against accusations of it being just a *Street Fighter* clone: 'It's insulting to hear it being regarded as a *Street Fighter* clone. Is *TFX* an *F19* clone? There are flight sims, there are platform games, there are also combat games. It's a genre of product, but this isn't just a *Street Fighter*. It has gameplay that has never been seen before and graphics that have never been seen before – it's the next generation.'

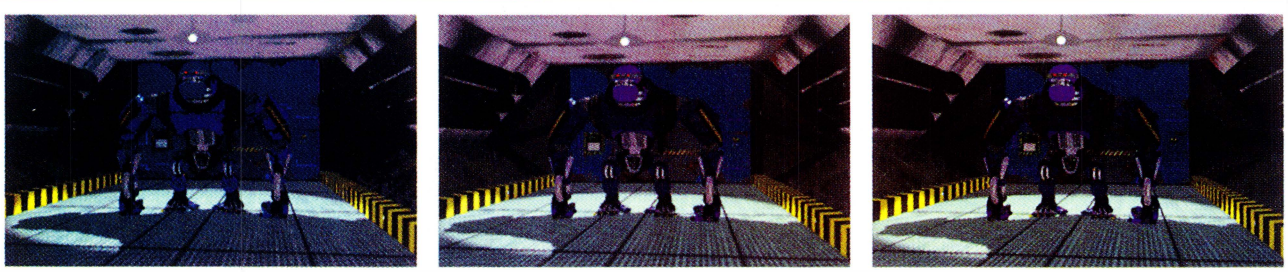
Let's hope those words ring true when *Rise Of The Robots* is finally released for PC and Amiga sometime in January. E

MIRAGE

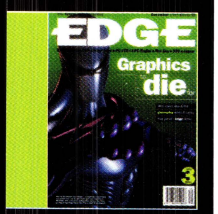
Credits

Designer:	Sean Griffiths
3D modeller:	Sean Naden
Interiors:	Kwan Lee
Amiga programmer:	Andy Clark
PC programmer:	Gary Leach

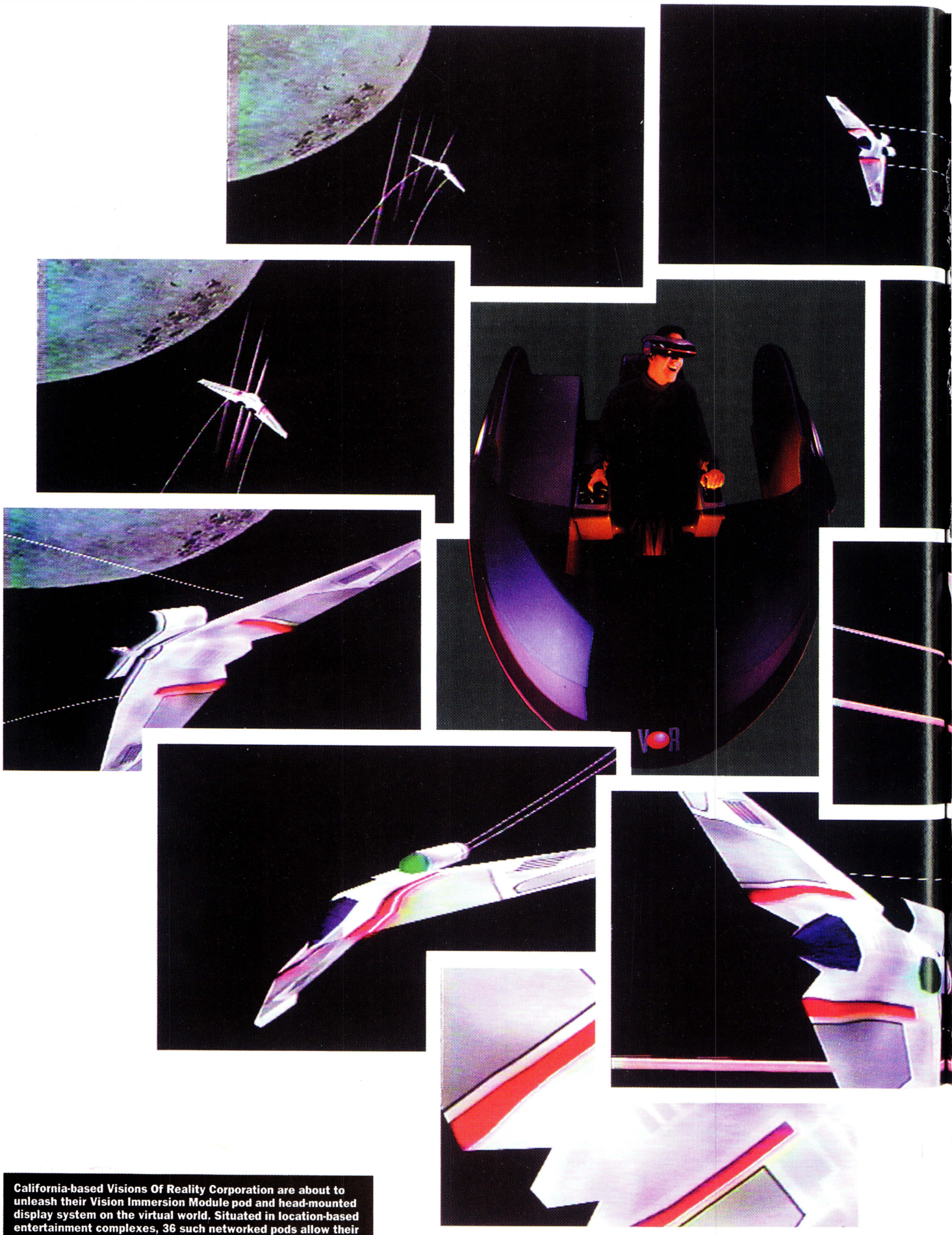
How the **Builder droid** compares on Amiga and PC



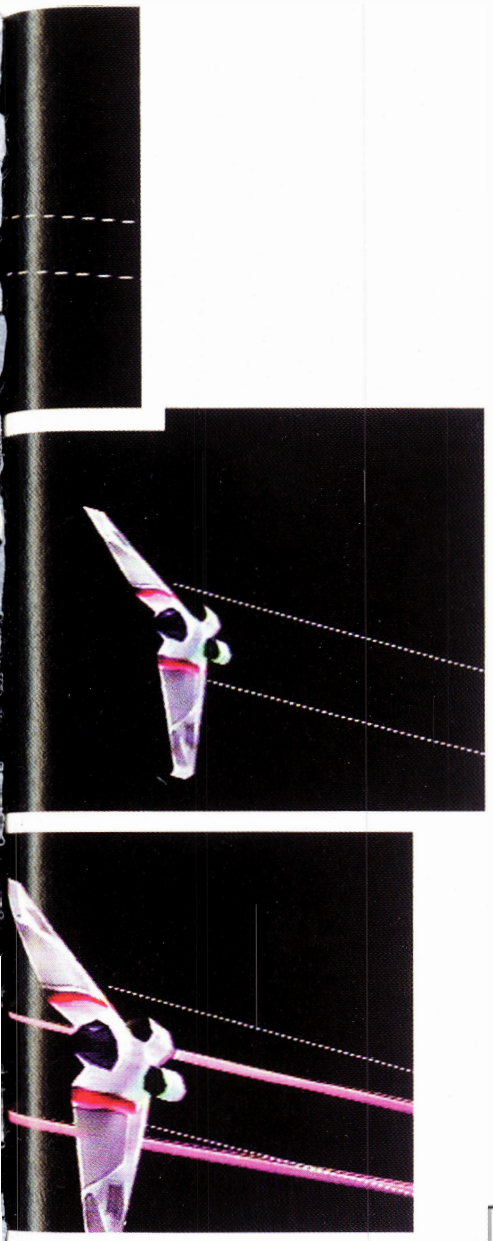
The robots in the PC version use up to 1·5 meg of disk space – and still the programmers have had to drop the detailed shadows to speed the game up. The Amiga version uses only around 200K for each robot image. The above three screens show the PC and the A500 and A1200 versions of the game. The Amiga 500 screen (left) may lack some of the detail of the PC version (right), but the main characteristics of the robots are left intact



Of the many thousands of images printed in **Edge** over the years, we'll always have a special soft spot for anything featuring a man or woman with a virtual reality visor sitting awkwardly on their smiling head. Here, we present a collection of the very finest examples, and extend to you an invitation to cyberspace...



California-based Visions Of Reality Corporation are about to unleash their Vision Immersion Module pod and head-mounted display system on the virtual world. Situated in location-based entertainment complexes, 36 such networked pods allow their 'pilots' to interact within a deepspace battle scenario



VR

The next step...

Virtual Reality has for so long been the subject of science fiction, hype and confusion. But now, at last, it's about to happen. Bigtime. Playing videogames will never be the same again; **Edge** takes you into the next dimension

You probably have your own idea of what VR is and you probably came to your conclusions after spending an afternoon at the Trocadero, seeing Lawnmower Man, reading Neuromancer or Sellotaping a Game Boy to your face and heading into town.

The truth is, however, that VR is still defining itself. It currently consists of lots of different companies coming up with lots of new ideas and translating them into ingenious hardware and software devices. It consists of Sega linking up with Virtuality to try and introduce VR to the home, it consists of all the major coin-op manufacturers in the world realising that banging away on a couple of buttons just won't cut it any more, it consists of the industrial and military giants who are experimenting with perception control and environment creation, and it consists of all the major consumer electronics companies

VOR's system (opposite) uses the new hi-res Personal viewer from Kaiser Electro-Optics

Continued next page

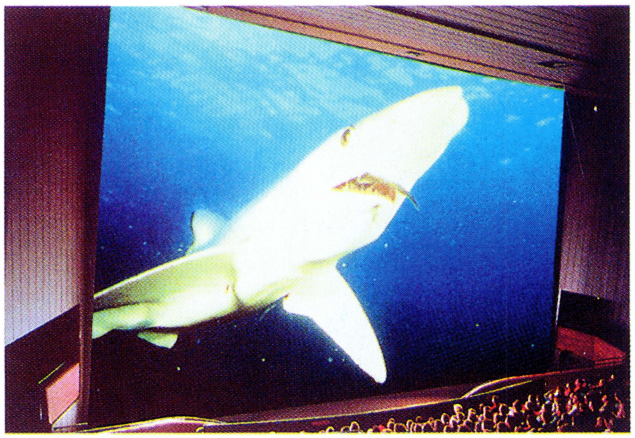
Defining Virtual Reality

There are many ways to generate a virtual reality or immersive experience. Someone sitting at home playing *Sonic The Hedgehog* on a big TV with earphones on is effectively immersing themselves in that environment: interacting with that world to the exclusion of other stimuli.

Of course, the *Sonic* player is very much a third party. When Sonic runs and jumps the player feels nothing, and always views the world from the outside looking in. This is indirect immersion.

The next step is to provide a firstperson perspective – think what it would be like playing *Sonic* through Sonic's eyes? And then, if every time he performed a loop-the-loop, your pulled the same Gs and felt the same sensations?

This is what the latest generation of theme park rides endeavour to do. Universal Studio's Star Tours, Body Wars and Back To The Future Rides are the state-of-the-art in that department, providing thrilling rollercoaster rides through space and time – without ever actually moving more than a few feet in any direction. By choreographing 3D motion of the hydraulically-supported vehicle to the movement inferred by the film (which, in the case of Back To The Future, is displayed on an IMAX-style screen) the audience really feel as if they're turning, banking and diving.



A great white shark about to devour an entire IMAX cinema audience. This is about as virtual as most people would want to get

Of course these rides are linear. The special effects never vary and the audience cannot alter the outcome of the ride: it's always the same.

A more interactive world can only be generated by using computer graphics to render the scenery in real time. And this is where the likes of Evans & Sutherland come in, with their Virtual Adventures rides.

These are defined as partial immersion and some might argue that the presence of others – and also the props and vehicles – within the experience bring it all back down to earth.

The next step is to go for total immersion, where everything that the participant sees is generated by computer and fed directly into stereo eyephones in a head-mounted display (HMD).

Motion sensors detect the movement of the participant and adjust the field of view accordingly: swing your head to the left and the virtual world – or playscape – pans past from left to right.

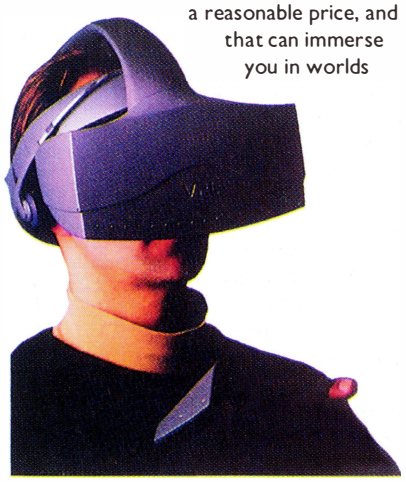
However, the move away from passive entertainment, videos, movies, theatres etc, to interactive entertainment – already dubbed 'Intertainment' may not be a smooth one. There has already been some fears voiced in the press over long-term exposure to LCD or CRT screens in close proximity to the eyes. **Mark Pesce** – formerly of the Ono-Sendai Corporation – explains: 'A headmount 'decouples' the sense of binocular parallax from the movement of the eye muscles. In essence, the HMD cheats your brain into seeing a stereo image, without requiring your eyes to develop a parallax view of the image. This causes the eyes to become lazy [and] until the kids start walking into walls because they can't detect depth properly, we may not know for sure how serious this problem is.'

If this debate continues then the future of Immersive Reality Entertainment could be in some doubt.

Continued

in the world dedicating at least some of their R&D to the subject.

One day, it will consist of machines that bring together all of this and more for a reasonable price, and that can immerse you in worlds



VPL's Microcosm VR system features the EyePhone XVR, a smart, lightweight HMD

Industrial and military giants are busy experimenting in perception control and environment creation...

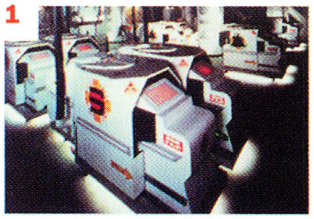
that are yours to explore and interact with.

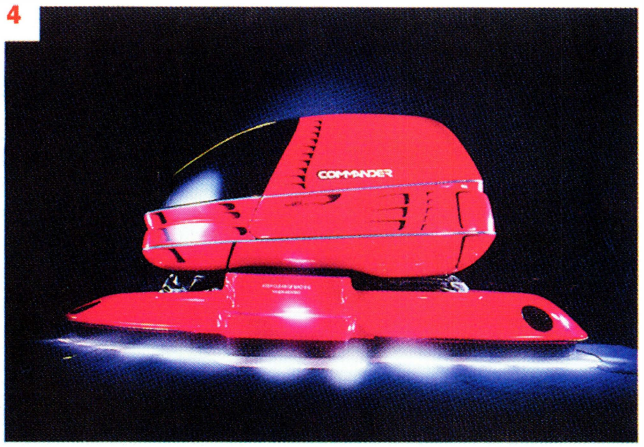
For now, however, let's start at the top. NASA's Ames Research Centre in California is a hotbed of VR research, producing 3D views of the martian landscape in real time which can be flown over by budding cybernauts. Other systems control robots with stereo cameras in their heads so the person controlling them sees the world exactly as the robot sees it. This is called 'telepresence' – you literally feel as if you are somewhere else.

Controlling robots in other countries or even on other planets and seeing and hearing exactly what it sees and hears is already being discussed as a real possibility for the future.

All over body suits would complete the vicarious experience. If you want to reach out and grab something, you can. The arm of the robot will replicate your movements, and sensors conveying the size, texture and weight of the object will give you the impression of actual contact.

The primary application for such devices will, of course, be space exploration – NASA doesn't make consoles, yet. Nor, sadly, have they announced plans ever to do so. But the games market can still feel the benefit





1 Chicago's Battletech centre provides a virtual arena where giant walking robots attempt to demolish one another

2 The VR8 coin-op is probably the cheapest VR arcade game. The binocular display is mounted on a mechanical arm which allows the path of the viewer to be tracked without complicated sensors. The game is a 3D *Tank Battle*

3 This urban scene shows the quality of graphics that can be generated real time using a Silicon Graphics RealityEngine. With hi-res HMDs this is the level of realism VR users will be enjoying in only a few years time

4 The Hughes Rediffusion Commander is the world's first motion based VR capsule. However, with the acquisition of Rediffusion by Hughes Aircraft, the project was cancelled and is now up for sale. Offers please...

5 A joint venture between the Virtuality Group and Matsushita, the CycleExa Virtual Exercise Cycle gives the bedroom cyclist something to look at while he or she cycles for fitness. Pedal fast enough, though, and the cycle 'takes off' providing an aerial view of the countryside

6 One of Virtuality's stand-up coin-ops. Featuring a *Dungeons And Dragons*-style experience, the player wields a virtual weapon to despatch his networked adversaries

through a sort of technological trickledown – the process that has already seen previous space missions spawn items such as the non-stick frying pan and the electronic calculator.

And the likelihood of such technolcgy reaching the home user is increased as all organisations and companies become more and more aware of the commercial potential of military and industrial innovation in the consumer market.

Evans and Sutherland, one of NASA's leading suppliers of flight display systems has already forged a link with Iwerks Entertainment, specialists in big screen projection and state-of-the-art theme park simulation experiences. Together they are working towards an incredible 3D VR arcade system called Virtual Adventures, the first of which should be up and running in the spring of next year.

In another broad and promising alliance, a Californian company called Visions Of Reality has joined forces with aerospace and electronics giant Kaiser – supplier of displays for military simulators and actual aircraft. Their aim is to produce a range of virtual reality games for use in arcades or theme parks.

Their first product, a shoot out in space, is about to go into production soon, and future projects include aerial dogfights, helicopter flights and car racing simulations.

All these will come with a specially designed headset using a version of Kaiser's technology that contains electro-magnetic sensors to provide the computer with information about the speed and direction in which the player is moving. The computer then responds by generating hi-res stereo images – all in real time – resulting in what Visions claim will be a 'fully interactive world'.

Ono-Sendai Corp

of Japan are very much into making usable and, more importantly, saleable VR equipment. Founded in 1991, Ono-Sendai Corp wants to make affordable VR hardware and software that'll enable consumers to interact with the TV and with each other in a shared virtual space.

The company has a mission: 'to bring enabling low-cost, high-performance software and hardware technologies to consumers in their homes, workplaces and wherever there is a television.'

This is very much the kind of territory the likes of 3DO are wanting to inhabit too, so it's a possibility that these two companies may get together.

They are also developing one of the smallest and lightest HMDs ever devised, and are currently talking to a number of companies about licensing the technology.

Ono-Sendai has also developed what it calls 'three dimensional sourceless orientation technology' for its virtual reality head-mounted displays. The company has discovered additional applications for the sensor, including use in a remote control

Continued next page

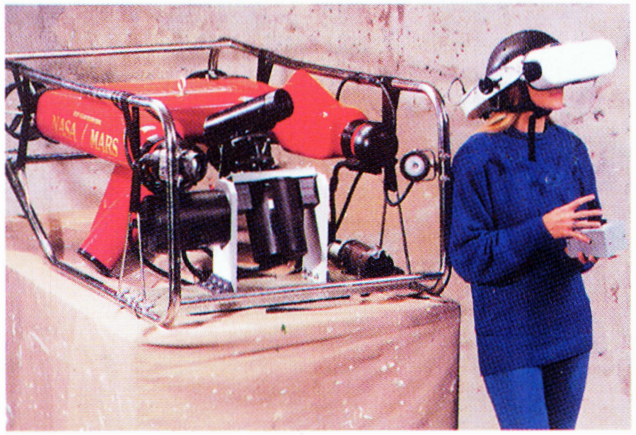
techview: VR

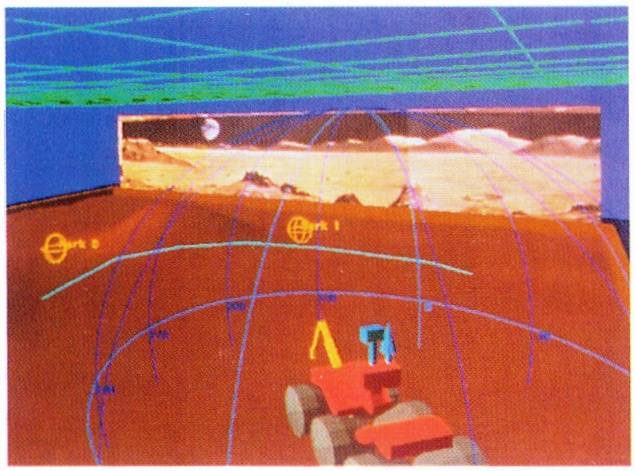
The history of Virtual Reality

The early forerunners of VR were experiments in cinema, like Cinerama and Sensorama, techniques involving very wide screens to totally involve, or 'immerse', the user in the experience.

This culminated in 1970 with the IMAX cinema, a totally enveloping experience, which you can only see in the UK at the Bradford National Museum of Photography, Film and Television (0274 732277).

The screens are large and curved and the seats are steeply raked in front of the screen to provide a huge 70mm movie image which fills your peripheral vision, giving you the feeling of really being there – wherever 'there' might be.





(Above) NASA scientists research the viability of telepresence using underwater ROVs linked to the controller via a stereo headset. (Left) A virtual ROV explores a Martian landscape generated by Sense8 Corporation's WorldToolKit

Another root of VR was the old stereo image viewers, invented in the mid 1800s by a chap called Wheatstone. These devices were in every home, and were something of a craze at the time: if Sega had been around in Victorian times, they would have been in the stereoscope business.

This technology evolved until the late '40s when the Viewmaster become a similar craze for young and old alike. This was the first worldwide VR experience that most people had access to, showing real 3D photographic images of places they had never been before – only the sound was missing.

The Sensorama machines designed by Morton Heilig in the late '50s and early '60s came closest to the virtual reality experiences we know today. A chair sat in front of a booth like an arcade machine and the device had a binocular vision viewer, handlebars, jets of air which could blow in your face on cue, a vibrating seat, vents near the nose to generate scents, and stereo sound via speakers next to the ears.

The ride was a stereoscopic motorcycle ride down a Brooklyn street with the sounds, sensations and the smells all happening in sync. Nothing like this has been made since, not even with the most expensive computers. However, Heilig lost the backing of the movie companies for his machines, as the film business relied on massive audiences and quick turn around of money. They

Continued

for consumer electronic devices. Simply by moving the remote up, down or sideways the user will be able to easily perform such functions as changing the television channel, adjusting the CD-player volume and controlling a VCR.

This new sensor technology has been licensed to 'a major videogame company' for use in a virtual reality game system shipping soon in the US. Any guesses who it might be?

Other participants in the project include Sense8, the leading supplier of software development tools in the VR field, and Silicon Graphics, the computer design company behind the special effects in Jurassic Park and Terminator 2 – and the firm with whom Nintendo is working towards a 64bit super console.

Nintendo is a company that has had links with VR from the early days – through its PowerGlove VR gaming peripheral, which was designed by VPL. One of the first big names in the industry, VPL was a company that rose and fell, but not without causing a stir in the market with its visors, datagloves and allover datasuits. All were very high quality devices which at the time represented the state of the art. Its final product was the Microcosm home VR unit based on a Mac Quadra and i860 graphics accelerators.

Sega VR may turn out to be just a nod towards the technology – while it works on the real kit

The Nintendo/Mattel PowerGlove that VPL created was designed as a scaled down VR peripheral for Nintendo NES game consoles. Sadly, the unit was a little before its time and soon stopped production. Ironically it is now one of the most used devices in DIY VR machines, due to its quality and price. When it came out it was just $80, as compared to $5,000 upwards for any other kind of dataglove.

Theme parks and arcades are where largescale VR is starting to happen first. There are already 50 machines from Virtuality (formerly W Industries) onsite throughout the UK, and with the company receiving a massive funding boost through a stock floatation later in the year, it is set to significantly step up its activities.

The firm has already signed a deal with Sega to work towards machines designed for Sega's Virtual Reality theme parks –

One of Evans & Sutherland's military simulators in full flow. The technology developed for military simulations, and head-mounted displays for targetting, have had a major bearing on the development of VR

didn't of course bank on the coin-op videogame boom being just around the corner.

Computers were then very big complex machines which you had to adapt yourself to, rather than the other way round. There were no graphics, just text, and no video monitors, just teletypes and punch cards. It was a very complicated and not very intuitive experience. That is until in 1968 when Douglas Engelbart invented the use of CRT display and the mouse pointing device, along with icons on screen. He also invented the word processor, and a rudimentary hypertext system.

At the same time on the East Coast a guy called Ivan Sutherland was hatching what would turn out to be 2D, and later 3D, computer graphics using a light pen to draw on the screen of a CRT. Sutherland also invented the first head-mounted display (HMD) which was nicknamed Sword Of Damocles due to the huge weight of equipment suspended over the wearer's head.

Around the same time, at the University of Wisconsin a guy called Myron Krueger was using computers and video to create what he called 'artificial realities', video installations which enabled users to walk up and interact with computer generated objects, not unlike the recent Mandala system running on Amiga computers.

Krueger's experiments were the first VR video games. *Critter* showed a video silhouette of your head and shoulders and introduced a computer driven bug onto the screen. The critter crawled up your head and could be picked off by your hand. You could dangle the thing before flicking it off – fun, but really serving no purpose beyond that.

The third and final element, *GROPE*, was added by Fredrick Brooks working at the University of North Carolina in the early 80s. He devised a way of creating 3D models of molecules and providing the user with tactile feedback, so you could 'feel' them. Using a 3D image and touch, you could dock molecules together.

With all the pieces of the VR jigsaw available, all that was required was for VPL's Jaron Lanier to coin the term 'Virtual Reality' and a myth was born.

already massively popular in Japan, and due to be introduced here in the new year.

And from the arcades, of course, the trickle down continues. Sega has already stated that it hopes its relationship with Virtuality will lead to improvements in its consoles and the development of increasingly sophisticated home VR. The Mega Drive itself, remember, is a spin-off from Sega's substantial arcade business.

The Japanese giant already has plans for a VR headset designed for use with its Mega Drive. First previewed earlier this year, the launch date has been put back, possibly in response to a lukewarm reception from press and the industry.

The unit employs a head-mounted display (HMD) with stereoscopic vision and motion trackers to move the picture as you move your head. 360 degree sound is supplied by the QSound system pioneered by Archer Communications, and, according to Sega's press release, 'Sega VR will be the first full-colour virtual reality unit for the home and will be available under $200.'

Half a dozen games are being developed for it, and they aren't just Sega platform games with 360 degree screens. Although you can play ordinary games on the HMD, the games written for the system will be specially coded.

These include a cyberspace game where you battle hostile computer hackers in an environment similar to the William Gibson books, and a 3D *BattleZone* clone. A whole line-up of 'proper VR games' are planned for release over the 12 months following release of the unit.

In truth, however, Sega VR may turn out to be just a nod towards the technology – a 'me too' gesture letting the world know that VR is part of Sega's plans while it works on the real kit with Jon Waldern's Virtuality team.

Sega's VR headset will be the first step to introducing 'real' VR technology into the home, but other tools are coming along. The most potent pointing device yet created for VR environments is a sort of VR mouse, called a six degree of freedom (6DOF) mouse. One such mouse is made by Logitech, although not as yet as a

The Virtual Research 'Flight Helmet' – universal workhorse of the VR community

Continued next page

EDGE magazine December 1993

Evans & Sutherland – VR pioneers

For 25 years, Evans & Sutherland of Salt Lake City in Utah, have been providing photorealistic computer generated images for military and scientific simulations.

E&S produce rendering hardware that makes a Virtuality coin-op look like a Game Boy – their top-end Image Generator can display up to 24,000 texture-mapped surfaces every single screen refresh, *real time*. No sitting around waiting for single frames to draw.

Now they're putting their experience of simulating reality to use in simulating imaginary worlds for the entertainment field – coin-ops and virtual reality.

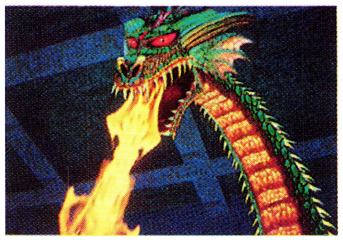
They're currently working with Namco toward the next generation of 3D arcade machines and have joined forces with Iwerks Entertainment on their Virtual Adventures theme park ride.

The as-yet-unnamed ride features four undersea vehicles attempting to save the Loch Ness monster from extinction. Each vehicle holds six people: pilot, navigator, two observers in the rear with periscopes and two robot arm operators who collect the endangered eggs.

The entire installation contains eight vehicles with four working at any given time, while the other four are being prepped for the next run.

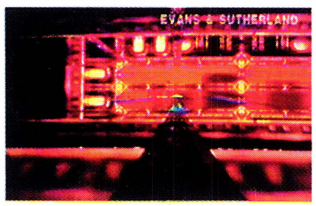
Of Virtual Adventures, E&S' communications manager **Jeff Edwards** says, 'We really didn't want it to be an individual experience as you'd have with a helmet; it's kind of a non-social activity.

'The Virtual Adventures

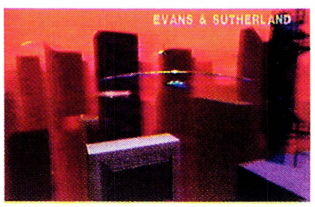


This Martian landscape (above) shows what E&S' sub-$100,000 Liberty system can do. A dragon belches flame in 'Hypergatory' (left) – E&S' stunning technology demo, showing that they can do more than tanks and jet fighters

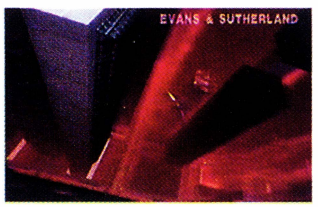
1 The flight begins with your hanglider launched through a portal atop a towering skyscraper



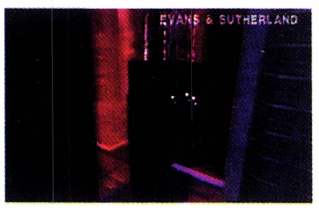
2 Like flying over the edge of the Grand Canyon, you suddenly find yourself miles above nothing



3 Swooping down over the edge of a building, your stomach rendezvous with your throat



4 As your fellow hangliders carry on, you peel off and follow a small group of hoverships



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consumer product. It's sold purely as a developer's kit, for researchers into VR, but who knows – within a year this could all be in the home. Think about it. The 3D Graphical User Interface (GUI), complete with 3D mouse. Not only will your desktop no longer be confined to the screen, it won't even be limited to two dimensions...

But before VR comes crashing into the home, let's get a good handle on what it is – just so we'll recognise it when it arrives. The elements of a working VR system can be broken down into two parts, the 'effectors' and the 'reality engine'.

The effectors are the HMD incorporating the visual displays and headphones, the transmitters which locate body position and orientation, plus any other control devices like datagloves and force balls/joysticks. The reality engine is anything which supplies and controls the experience, like the CPU, the software, video cards, sound processors, synthesisers, and I/O ports for all the individual effectors.

Sensors on the HMD relay your exact position to the reality engine over a cable-free link

Rendering the 3D image in both eyepieces is only a small part of the problem, although that in itself has taken years of development to get it to even today's standards. The thing which really makes the difference between a 3D game and a VR experience is tracking the head movements from side to side and up and down, and relaying those in real time to the computer sending the visuals, so that they change in sync with your viewpoint.

Sensors on the top of your HMD receive a signal from a transmitter on the main unit, and relay your exact position to the reality engine over a cable-free link.

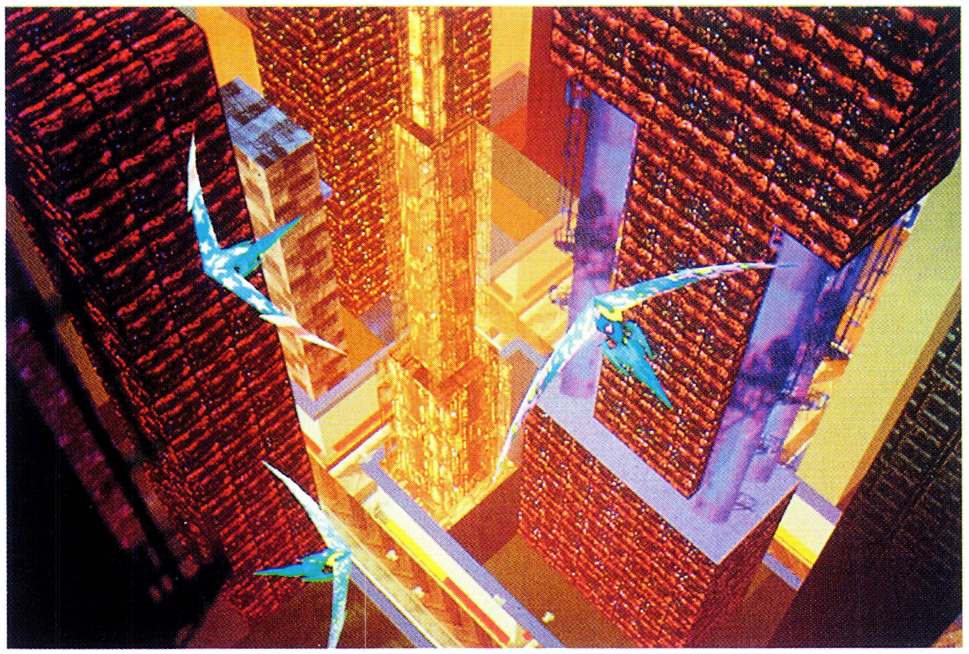
The reality engine is generally a fast computer, at least a 68030 or 68040 Amiga or 80486 PC clone, coupled with a pair of fast dedicated graphics processors. This enables the computer to generate two near-identical images in almost real time with only a marginal time lag between moving your head and the image tracking in the viewfinders.

The Virtuality system, for example, uses an Amiga platform with custom TI 34020 graphics chips and its own built-in

project is different because there's six people sitting in the cockpit together. They can freely interact with each other, they can trade places during the game, they can work as a team, which might be a really good family experience.'

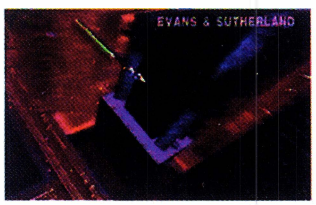
The ten-minute VR ride is powered by E&S' ESIG2000 image generator and the whole installation costs a cool $1million – you won't find many outside of major theme and amusement parks. The first customers will be announced shortly, with installations online by spring 1994.

And seeing the potential of this emergent marketplace, E&S are starting to produce a new family of sub-$100,000 machines, starting with the Liberty, which are targeted directly at the entertainment field.

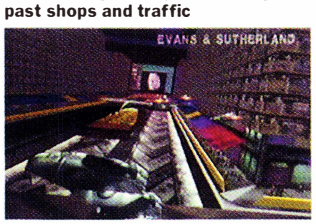


To demonstrate the potential of their systems, E&S have produced a virtual hanglider ride (see below). The 3D background is rendered realtime as the pilot steers his hanglider through the virtual cityscape

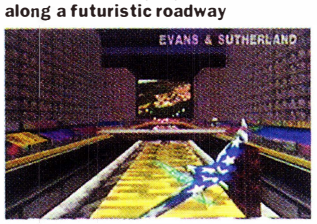
5 Spiralling round the buildings, you go into a steep dive and head for the busy streets below



6 Approaching ground level, your hovering convoy skim along past shops and traffic



7 Flying low under bridges and over walkways, you hurtle along a futuristic roadway



8 Finally, you come to rest in front of a screen advertising E&S' 'Liberty' imaging system

sound. Sense8 Corp use Intel PCs with i750 and i860 graphics chips, with MIDI and 3D sound processors, but some of its systems are also based on ultrapowerful Sun or Silicon Graphics workstations.

Hardware this fast enables you to create a full colour 3D world which is able to move and follow your movements at about 10 frames per second. This doesn't sound a lot, but it's enough to give you the ride of your life. And the technology is improving all the time, and faster machines mean faster VR.

To produce real 3D on the fly, two images are generated in real time, simulating your view of the virtual world. The two 'cameras' through which you view the world are set at eye distance apart. This has the effect of generating a stereo image with enforced depth perception.

The information is finally fed to the graphics boards, which generate the images for each eye and send the images to the HMD for visualisation.

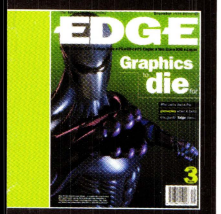
We are still not quite there yet, but according to all the experts, true VR in your living room or on your desktop is only about 12 months down the line. So you'd better get ready.

Like all possible futures, the one where VR becomes a household tool is only one of many options. It may be that VR turns out to be a flash in a much larger pan, and it merely points us in the direction of a new, as yet undiscovered communications technology.

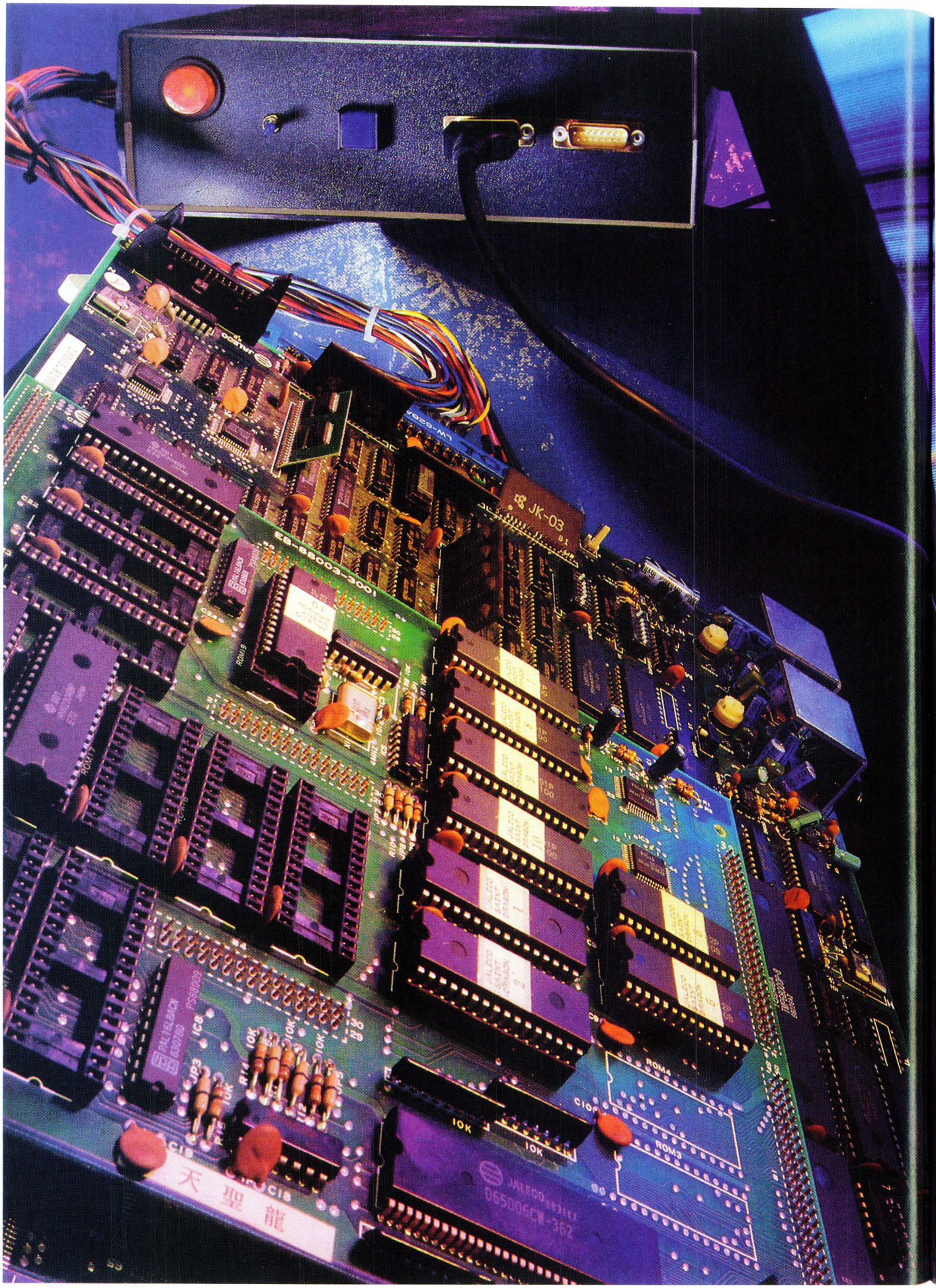
As the phone spawned the TV and the TV spawned the computer game and the computer game spawned VR, perhaps VR is just a stepping stone to a higher form of computer interaction. On the other hand perhaps VR and lightweight HMDs will become as commonplace as the mouse or Walkman headphones. It could be. VR is a like a telescope or microscope, a tool to make something previously invisible more accessible. Whereas those other tools look at distant stars and minute particles, VR is a tool for looking at information, and presenting it in the most natural way. Sound, vision and touch, all these sensory tools help us to learn about things and to evolve better ways of working, living and having fun.

Welcome to cyberspace.

Virtuality's coin-op headset now looks out of date compared to the very latest HMDs



For some time, during the dark years before emulation made bringing coin-ops out of the arcade something of a trivial pursuit, a pair of Superguns were among the most commonly used pieces of gaming kit in the **Edge** office, and this six-page celebration explains why. You just don't get same geek buzz with MAME.



Photograph: **Peter Canning**

Firing the Supergun

Ever fancied playing your all time favourite coin-op in the comfort of your own home? With a Supergun it's easier than you think...

The golden age of the coin-op might be well and truly lodged in the past, but for many gamesplayers, older machines still hold a certain magic. Ever wondered why seaside amusement arcades are often packed with the oldest games? Sure, daytrippers will play anything

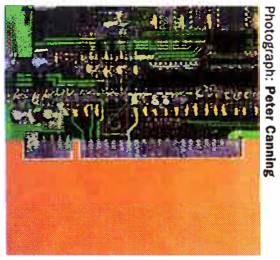
techview: arcade

JAMMA-standard boards

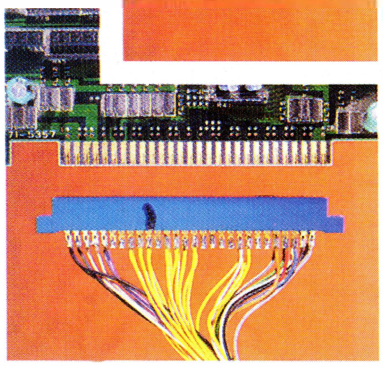
JAMMA is a PCB connection standard set by the Japanese Amusement Machine Manufacturers' Association. It was designed to help the arcade manufacturers in Japan to agree upon a standard for the connection of arcade PCBs to arcade cabinets. By this time the industry had quickly cottoned onto the idea of replaceable boards – arcade owners simply had to remove a board from a machine and stick in a new one. From 1987, most PCBs became JAMMA compatible.

Because the Supergun is designed to work only with JAMMA boards, older non-JAMMA PCBs require an adaptor loom to be wired off – something best left to a specialist. The main reason for this is that it's complicated – it requires reference to the manual for the pin-out diagram – often missing with older PCBs.

Companies like Euromax (0262 601006) keep reference manuals, and will convert most older boards for only around £30.



Photograph: Peter Canning



The Supergun uses JAMMA PCBs – the connection standard. A non-JAMMA board needs an adaptor loom (inset)

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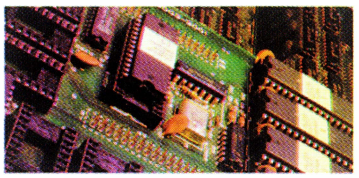


as long as its cheap, but for the average coin-op fan there's usually a few cast iron classics hidden away in a corner that are worthy of attention. State of the art? Well, hardly. But time doesn't taint great gameplay. You'd be surprised just how easy it is to play games like these in the home.

The current range of boards is vast, and all are destined to get cheaper

The Supergun is hardly a new piece of kit – gamesplayers have been able to get their hands on various versions for a couple of years. Funnily enough, before that, the UK market had been promised a slicker-looking unit called the Energiser, but this failed to materialise, leaving it to Far Eastern entrepreneurs to design what became known as the Supergun. The Supergun Deluxe is the newest unit, and comes from Raven Games in London. It is basically a simple box containing a five volt transformer, JAMMA board interface, Scart lead, and credit selection button. This plugs into a Scart socket-equipped television or monitor, allowing the player to chose from a vast range of titles.

But does the system really have that much to offer? Isn't it just an elitist home system with ultra expensive games? Elitist? Yes, gloriously – just think how many top arcade games you can choose from. Expensive? Not necessarily. The Supergun **Edge** tested only cost £160 excluding a joystick. Some older game boards are now selling for as little as £20, making the whole thing look rather affordable, and positively bargain-like when compared to the price of some of the latest imported console titles.

Taking into account the age of the average purchaser, videogame nostalgia is playing a big part in the success of the Supergun. Classic arcade boards are fast becoming collectable, and this is mostly because good new games are increasingly harder to come by.

With expensive dedicated arcade machines like *Virtua Racing* currently dominating the arcades in

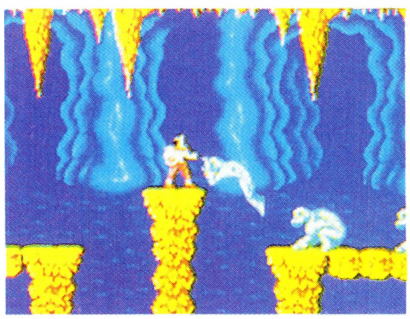
Arcade bargains for the **Supergun** – what to look for, and where to look...

In the same way a shrewd antiques dealer scours a car boot sale, an arcade game hunter on the lookout for classic coin-op boards should check out all the older seaside arcades, and be prepared to make offers on the spot.

But for more consistent results it's worth keeping an eye on the trade press, most notably the trade paper, Coin Slot International. And as in any secondhand market, prices vary widely, but dirt cheap PCBs are around if you look hard enough.

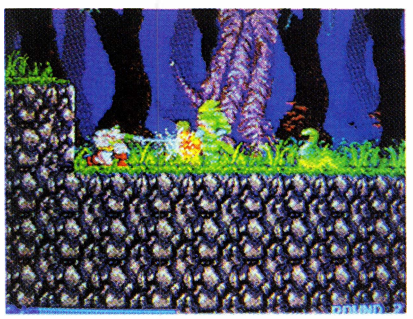
Edge tracked down some of the best bargains for the Supergun...

Rygar: (Tecmo 1986)
Price: £25
Not a overly popular game when released, *Rygar* soon gained a cult following. What *Rygar* has is fast and brilliantly compulsive and varied gameplay. Extremely challenging.

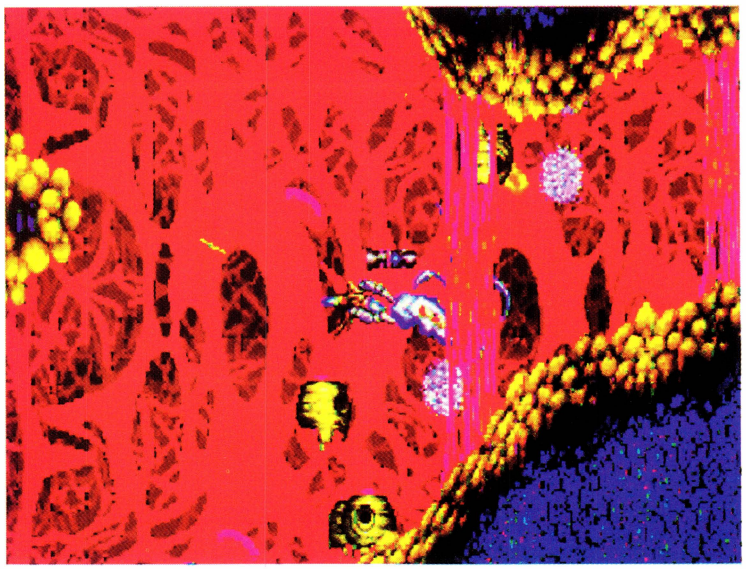


You'd be hard pushed to tell it from this screenshot, but for a six yearold game, *Rygar* has some exquisite graphics

Rastan Saga: (Taito 1987)
Price: £30
This classic hack 'n' slash arcade game never got a decent conversion for a home system. And you'd be surprised just how strong the gameplay is after all these years.



Why wasn't the Amiga treated to a conversion of this classic game? Anyone remember the less than brilliant C64 version?



Reckon that the Supergun is only ever going to be of any use for crusty old arcade games? Not so. Konami's *Xexex* at £100, while lacking a bit of playability in its UK format, knocks spots off many new coin-ops in terms of graphical detail and colour

terms of takings, interchangeable PCBs now lack the pulling power needed to generate decent coin flows. That, coupled with the competition faced by home consoles, is now making the price of the average PCB drop faster than ever before. And for the Supergun owner, this means more and more games to choose from.

The supply of cutting edge PCBs might dry out gradually, but the current range of boards is vast, and all are destined to get cheaper and cheaper. And, of course, the appeal of original arcade games, and not minimalised console conversions, is a big attraction.

To play a Supergun, all you'll need is a Scart socket-equipped television or monitor, sometimes referred to as the Euro-connector, or Peritel. But, importantly, the Scart socket needs to be able to handle an RGB signal running at 60Hz – the same signal that's outputted from imported NTSC versions of consoles like the SNES, Mega Drive PC Engine,

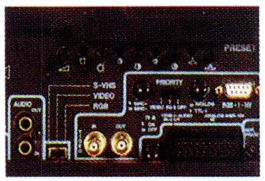
Continued next page

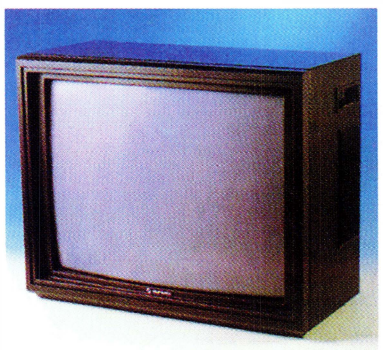
Monitoring **quality**

Running a Supergun through a Scart-compatible television isn't difficult. As long as the socket can cope with a 60Hz RGB signal. Compared to the system running on a specialist monitor, the control over the picture is limited. Things like colour balance and screen size often benefit from being optimised on a specialist monitor, like those made by Hantarex in the UK. Quadristandard models like the CT series offer Pal, Secam, NTSC, and NTSC 4·43 compatibility through a variety of sockets including Scart, nine-pin DIN, S-VHS, RGBI-HV etc. They're also perfect for systems like 3DO and the Marty that currently require an NTSC-compatible TV or monitor. Compared to the price of televisions that can cope with NTSC (£700+), Hantarex's monitors are quite well priced:

21" (£538)
25" (£572)
28" (£599)

Contact Hantarex on (081) 778 1414





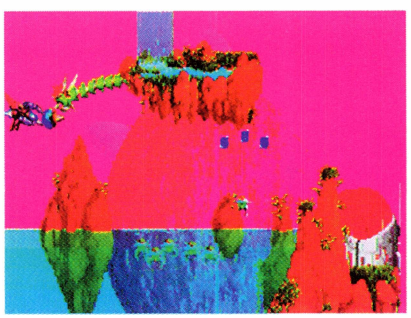
A Hantarex monitor includes every kind of connection and TV standard you'll need. See for yourself (inset)

Shinobi: (Sega 1987)
Price: £20
An popular platform scroller that won fans everywhere with its action-packed levels. Those graphics are now looking a bit rough. For the price, though, who's complaining?

Xexex: (Konami 1991)
Price: around £100
There are two versions of *Xexex*, a European and a Japanese edition. The graphics in both are seriously beautiful, but track down the superior Japanese version, if you can find it.

Strike Force: (Williams 1992)
Price: £125
Strike Force is the third defender game, and it uses impressive graphics and sound to bring it into the nineties. Surprisingly, it flopped in the arcades, but it still packs a mighty punch.

***Shinobi* never looked that good when it appeared in 1987, so naturally, today it looks terrible. It plays wonderfully, though**



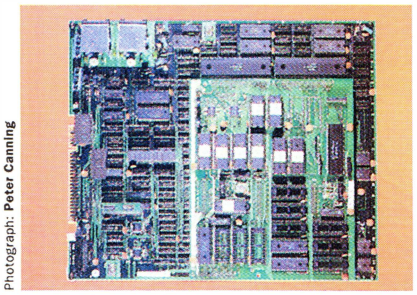
Okay, it looks utterly fantastic, but the gameplay in the UK version isn't that hot, to be honest. It's just too hard for words

***Strike Force* has some of the best explosions you'll ever see, and is only marred by some tacky incidental graphics (ie American)**

techview: arcade

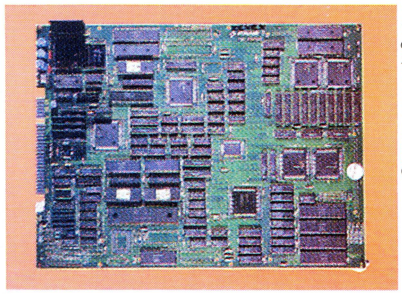
The old and **new...**

Not all arcade boards come as one unit. Some, like Capcom's CPS boards, come as a baseboard containing all the processing and graphics and sound chips, with top-mounted RAM boards carrying each game. The benefits are obvious. Arcades only have to remove the RAM board, and this costs a lot less than a PCB. Games like *Mercs*, *Strider*, *Saint Dragon*, can be obtained in top board format, and for the Supergun this is a cheaper way of picking them up. Don't be surprised, though, to see games sold with the base board attached. Older games are often kept attached for convenience.



Photograph: Peter Canning

Some PCBs keep the gameboard separate



Photograph: Peter Canning

Modern PCBs like *Xexex* use surface mounted technology

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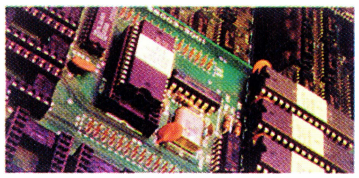


Neo Geo, etc. People familiar with Scart consoles like these will be no strangers to the full screen, full speed display that results. As long as your television or monitor can handle this kind of signal – you should have no problems running a Supergun.

Some problems arise from older Scart TVs that only work at 50Hz and, even worse, that can only handle a composite signal where the red, green and blue signals all go through a single pin. Sony and Philips televisions are a safe bet for 60Hz RGB Scart sockets, although many TV manufacturers are now incorporating 60Hz technology into their sets. Before parting with your cash make sure that the company supplying the Supergun will give you a refund should your television fail to be up to the job.

But what are the alternatives to something like the Supergun? How about a stand-up arcade cabinet? Surely the most extravagant choice in terms of price and the space it takes up. Second-hand prices vary from £150 up to about £350 depending on the age of the equipment and size of the monitor, with new machines clocking in at about £500-600.

The main advantage of an arcade machine is the control the monitor gives you over the display – it's possible to adjust things like colour balance, vertical and horizontal size, so that the game's picture can be optimised – things that can't be easily modified when dealing with a Scart input picture on the average television. Decent joysticks are another bonus. There is a downside, though. Removing boards is fiddly and nowhere near as simple as it is with the Supergun.

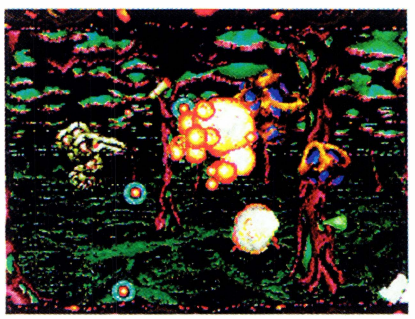
For players that hanker after the latest beat 'em ups, the Neo Geo is the ideal machine

People who snapped up Active's erstwhile Powarcade system – a stand up machine without a monitor

Mercs: (Capcom 1991)
Price: £40 (top board)
Like *UN Squadron*, *Carrier Airwing* et al, *Mercs* comes as a data board for Capcom's CP system board. A must for Capcom fans despite the Mega Drive conversion.

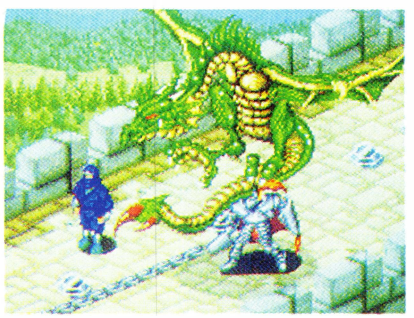
A threeplayer game in the arcades, *Mercs* is naturally just for two on the Supergun. Worth getting if you've got the CPS board

Saint Dragon: (Jaleco 1988)
Price: £30
The dragon-with-moveable-tail in *Saint Dragon* was bettered in Irem's *Dragon Breed*, but *Saint Dragon* is still worth a few goes. Hardly a must-buy though.



The gameplay's fun and the graphics are okay, but there are more classy shoot 'em ups around if you can find them. *R-Type* perhaps?

Dark Seal: (Data East 1990)
Price: £40
One of the better attempts at a fantasy-style coin-op – a cross between *Magic Sword* and *Gauntlet*. You choose a character and wander around castles hacking things to bits.

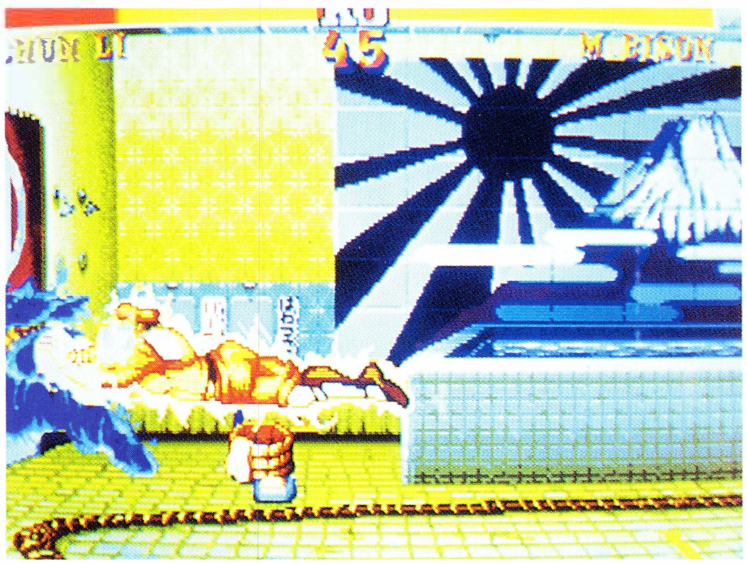


Some interesting graphics and fast paced action make *Dark Seal* worth the trip. And it's a darn sight better than *Arcus Odyssey*

– had no problems on that count. Sadly these systems are no longer in production.

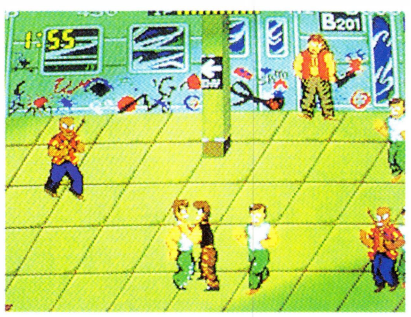
Another alternative is the powerful Neo Geo system. Using exactly the same technology as in Neo Geo arcade machine, SNK's hardware has worn well since it was launched in 1990 and it's only the lack of variety in the games – something borne out by SNK's commitment to its arcade side – that impairs its appeal. For the players hankering after the latest beat 'em ups, though, the Neo Geo is the ideal machine. Newer games cost over £150 – cheap compared to new PCBs – but older classics like *Magician Lord* and *Nam '75* now come as cheap as £60.

The Neo Geo looks smart and is exceptionally well designed, but it's really geared towards the player that wants a state of the art console system, rather than a platform to play classic coin-ops from the past. Of course you could always buy them both...



Street Fighter II Turbo **purists who even snub the recently released Mega Drive version (even when it's running at 60Hz!), could always fork out £400-£500 for the PCB. It'd be well worth waiting a few months for the price to drop, though,**

Renegade: (Taito/Technos 1986)
Price: £20
Technos are the only company capable of making a scrolling beat 'em up fun to play, and proof lies with *Renegade*, which is oodles more fun to play than *Final Fight*.



Don't those graphics look appalling in 1993? What you can't see is the really involving gameplay, though

Bargain PCBs

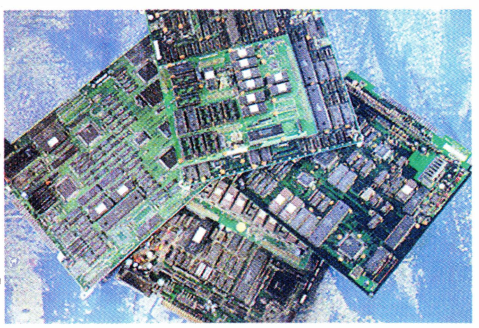
Rolling Thunder	£20
Ghosts And Goblins	£20
1943	£25
Block Hole	£25
Double Dragon	£20
Renegade	£20
Robocop	£20
Golden Axe	£35
Cobra Command	£40
Shinobi	£20
Terracresta	£20
World Cup '90	£50
Dark Seal	£45
Salamander	£45
Commando	£45
Moon Cresta	£20
Speed Rumbler	£50
Time Pilot '84	£45
Ninja Spirit	£100

The **Supergun Deluxe**

Photograph: **Peter Canning**

The Supergun Deluxe costs just under £160 and was supplied by Raven Games in Kent, a long established specialist videogame supplier. 'We'd looked at other versions of the Supergun and thought we'd be able to improve on them,' reckons boss **Tony Ryder**. 'As far as we know every JAMMA PCB works, old or new, and we've tried about 50-60 different ones.' A selection of decent PCBs are available, too, and Raven will even customise the Supergun to buyers' needs. The other extra you'll need is an Apollo joystick costing £55, or even a modified Neo Geo joystick. To save money, though, there's a version that takes simple Mega Drive joypads. For more details, phone Raven Games on: 081 663 6822.

PCBs and where to get them



Photograph: **Peter Canning**

Many second hand PCBs can be found advertised in Coin Slot International – the weekly trade paper for the amusement machine industry, published by The World's Fair Ltd. For information on how to obtain a copy, phone 061 624 3687. Every week the classified section is packed with both trade and private ads. Here's a selection of companies regularly dealing in PCBs, but the best bargains are often found in the smaller ads.

Euromax Electronics	(0262 601006)
Multiplay Leisure	(074488 6282)
Congleton Coin	(0260 278904)
Dellfern	(021 608 7040)
Brent Leisure	(081 965 0550)
Electrocoin	(081 965 2055)

EDGE magazine December 1993

Crash 'n Burn

The first 3DO game reviewed in **Edge**. There's no doubting that *Crash n' Burn* is an immediately arresting experience – only *Doom* on PC can touch it for texture-mapped detail moving at speed – although, like so many launch titles, it lacks depth. Crystal Dynamics will eventually go on to produce *Tomb Raider: Legend*.

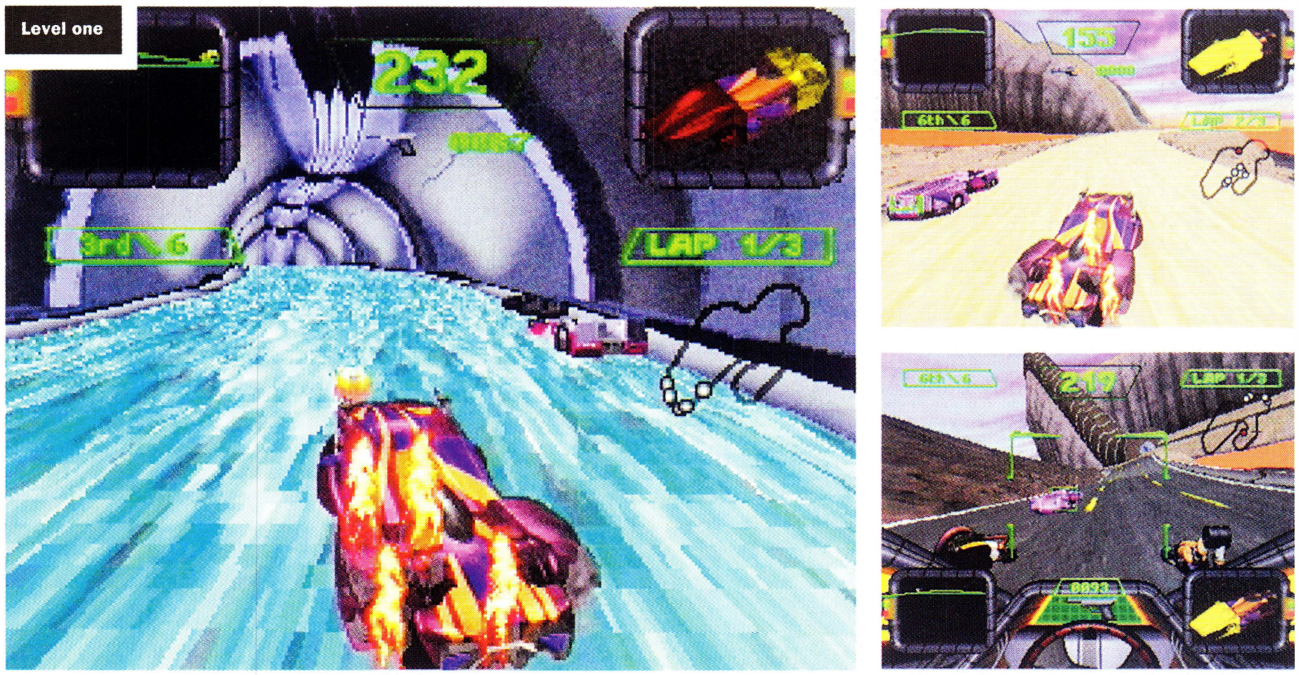
The level of detail in *Crash 'n Burn* is quite phenomenal: Crystal Dynamics have certainly set a very high standard with their first title. Although the screen may look a little blocky (above), it's moving so fast that you won't notice when you're playing. The outside view is best used for overtaking, and although the track is nice and wide, the opposition cars suddenly start swerving from one side of the track to the other. These flames may look damaging, but your car comes equipped with special body armour, and anyway a quick visit to the pits soon puts them out

Format:	3DO
Publisher:	Crystal Dynamics
Developer:	In-house
Price:	NA
Size:	1 CD
Release:	Out now (US)

For the 3DO to succeed it obviously needs exceptional software. If the games are poor, the machine will fail. It's that simple. A 'killer app', as the americans love to call it, is critical for the first few weeks of the 3DO's lifetime. It's something the Super Famicom had, and something the Mega CD has miserably lacked ever since its conception.

Crystal Dynamics are first up to try and convince us that the 3DO is the machine to have – *Crash 'n Burn* comes bundled with the Panasonic REAL Multiplayer, so buyers don't have much choice. But is it good enough to sell 3DOs, or does it leave the dreams of a certain Mr Trip Hawkins a little fragmented?

Let's start with *Crash 'n Burn*'s most appealing aspect, its graphics. Take it from us – since **Edge** saw the game at Crystal Dynamics back in July, things have progressed considerably. The frame rate is higher – approaching 20 frames a second – and the 3D



The 'Burn' in *Crash 'n Burn*, only becomes apparent once the action hots up (above). The exterior view (top right) gives the game a more arcade look but the inside view (bottom right) is best for targeting other cars. Your display provides you with weapon status, ammo count and a rearview radar

perspective is even more stunning – it's both original, and at times breathtaking. While the style of the game steers towards the simple, no-you-can't-turn-off-the-road type racer, the 3D environment more than makes up for it. Everything moves in 3D – hell, even the sky moves in 3D, and the road dips and twists with the most impressive banking effects you'll see outside of an arcade.

In all there are six circuits and each circuit has five tracks. The circuits range from the comparatively mundane Crash Course to the wildly undulating Whiplash.

There are two play options: Rally Racing and Tournament Racing. The former is a simple blast down the circuit – finish within the first three positions to qualify for the next track. Tournament Racing is an ongoing campaign, complete with weapon upgrades.

Yes, weapons. Not your ordinary 'bang, bang' weapon, but great 'whoosh, boom' ballistic missile-type weapons. *Crash 'n Burn* certainly lives up to its name, and all the cars have an impressive armoury. Weapons are essential and you soon learn the tricks of the trade – like allowing some of the harder opponents to overtake, then showering their vehicle with a barrage of missiles.

There are some disappointments. Quite a few, in fact. The sound's not great for one thing. In true american style the tunes are bland and rock-based. And then there's your car – it isn't the most responsive thing in the world. You have to start turning early in order to negotiate the corners. But even if you don't, your car can't fall of the edge of the track.

And remembering this is a CD-only system, the loading times are a bit offputting – they're especially bad considering the 3DO's 300K/s drive, and this is something that becomes more and more noticeable.

As the first game for the 3DO this is impressive enough, and certainly challenging. But then for $699 (with free 3DO machine) what do you expect?

Edge rating: **Eight/10**

Circuit **one**

The first circuit takes after its name Crash Course and acts as an introduction to some of *Crash 'n Burn*'s many aspects. The main competitors are introduced as are some of the basic play elements ie, kill or be killed.

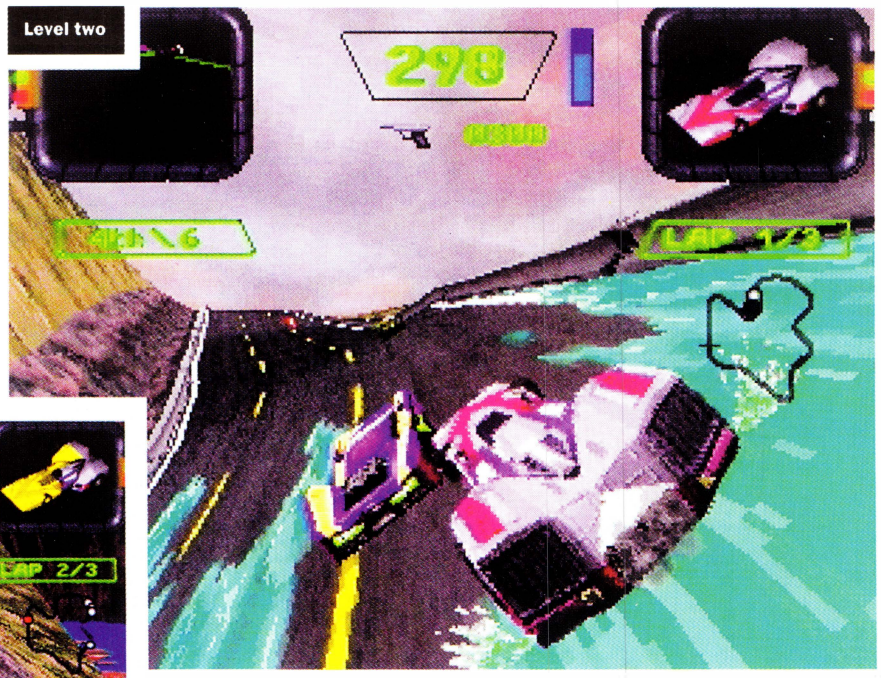
Continued next page

These are your main competitors. These digitised actors each go through the usual pre-race scare tactics. The car of your choice is also displayed as a rendered rotating image

testscreen

Circuit **two**

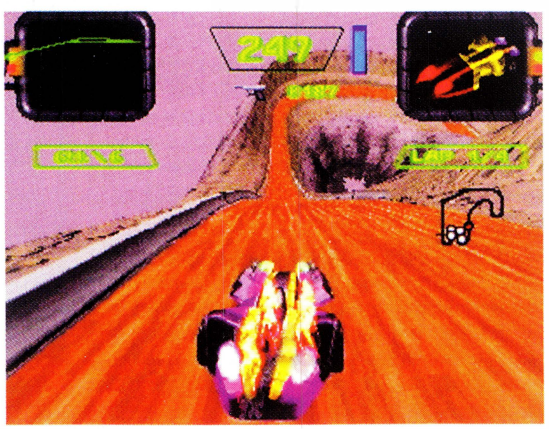
Whiplash contains some of the most undulating and treacherous courses on *Crash 'n Burn*. The tracks are tricky to negotiate and you'll need more than a fair dose of turbo boost to help you climb some of the hills. Again the road moves impressively, but what's more impressive is the way the surrounding scenery moves in true 3D.



The amount of opponents are limited (only six) but there are 'drone' cars that also race around the tracks, and their high level of artificial intelligence makes them almost as tough as the opponent's cars. There are times when you'll be flying down a track, with only one car in front of you, but that car will try its best to cut you up and block your progress. If you do manage to overtake, your car suddenly turns into a moving target, and you have to desperately swerve all over the place to avoid a fusillade of laser and missile fire. The M4 was never like this...

Circuit **three**

Shockwave – again this track is full of hills, but it also has more than its fair share of tunnels. Due to the narrow nature of these tunnels, you have to approach them with caution. There's great continuity throughout — if you destroy a competitor's car on a certain section of the track it remains there next time you go around.

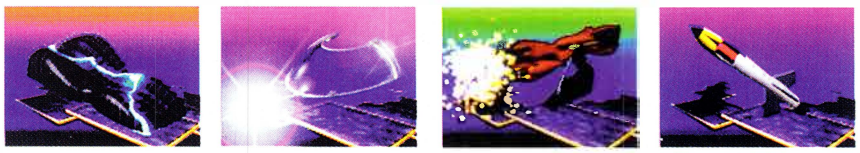


The Shockwave circuit is tough, but every bit as impressive as it looks in these static shots. A tunnel (above) looms into view, but by the looks of things you have heavy traffic to contend with. Everything moves in 3D, not just the track, but everything surrounding the track – the sky, the clouds, the canyons, everything. It proves that the 32bit machine has well and truly arrived. Travelling at 247mph downhill, towards a very tight bend is not normal practice for racing games. Then again *Crash 'n Burn* is no ordinary race game...

Currently in sixth place, and a section of the track appears above you. One of the most annoying aspects is the way the car handles, making overtaking (above right) slightly tricky

Circuit **four**

Later on in the Firestorm circuit, transparent tracks can be seen (or rather, seen through). These are very impressive and are well worth checking out. The action is now even harder than before and you really have to use all the weapons to get past some of the tougher opposition.



The weapon select screen further enhances the quality of this product. There are six main weapons to choose from, ranging from shields, missiles, guns, wheels, speed enhancers and special weapons. Each and every weapon is rendered and brilliantly shaded and animated (top)

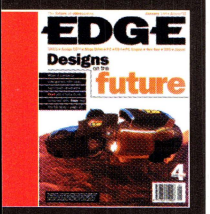
CRYSTAL DYNAMICS

Crystal Dynamics, the creators of *Crash 'n Burn* and *Total Eclipse* (see p19), is a small company based in Palo Alto, California. Formed by Dave Morse, boss of the New Technologies Group, and the team behind 3DO's hardware, the company has already established itself as a new breed of games producer.

Company boss Strauss Zelnick allegedly pulled in a million dollars a year in his previous role – as ex-President of Twentieth Century Fox, no less. Now he heads up Crystal Dynamics, steering the company in the direction of Hollywood production techniques while the programmers concentrate on improving gameplay – something Hollywood has yet to learn about.

Expect to see a lot more 3DO releases from Crystal Dynamics – the company is establishing an affiliate licensing program, like the one Electronic Arts has already setup, where it will publish and market other developers' games for the 3DO system.

Sony enter the videogame arena, **page 6...** Philips' **Digital Video** cartridge goes on sale, **page 8...** Atari **Jaguar** launches in New York, **page 9... 3D** steals the show at **A**ssociated **L**eisure **P**review '94 **page 10... Alien War** begins in London, **page 14...**

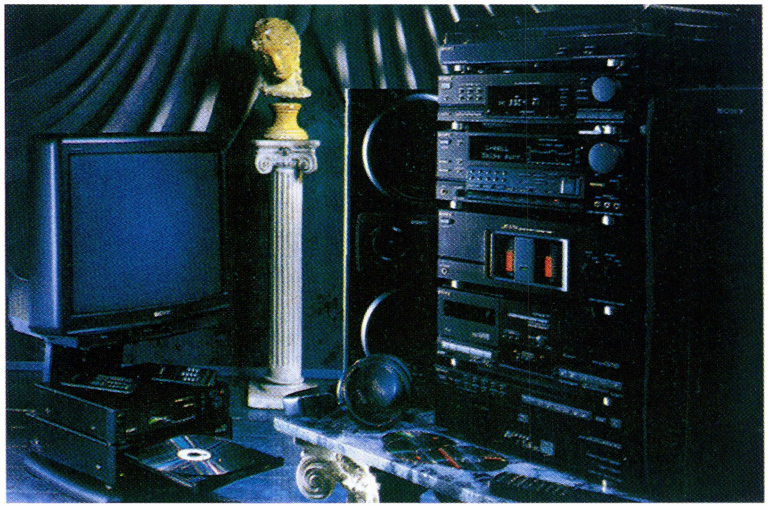


And so it begins, with the observation that if Sony decides 'to throw its weight behind [its console] it could more or less buy the games market'. It's not all about throwing cash at it, though, is it? What's more certain is that the machine will be 'matt black'. And that Nintendo should collaborate with Atari on its new console.

The very latest **news** from across the entire world of videogaming

Sony multimedia machine for '94

With Hollywood and the music industry firmly in its grasp, Japanese electronics giant Sony is now casting its steely eye over the games market...



With experience in TV, video, CD and Minidisc audio, LaserDisc, CD-i and electronic multimedia, Sony are well placed to enter the videogame market – and take it over

After years of speculation and one or two false starts, Sony has announced that it is to enter the interactive entertainment hardware market in the latter half of next year.

The global electronics giant will launch a CD console into the Japanese market in late 1994 with a European launch pencilled in for mid-1995. It is being developed by a newly formed subsidiary called Sony Computer Entertainment (SCE), which will also be developing software for the format as well as licensing the technology to third party developers.

Already the new machine is being thought of internally as 'one of the most significant hardware launches of the decade'.

In its official announcement, Sony commented: 'The next generation games machine is expected to offer high speed, simultaneous movement of characters and high quality backgrounds together with powerful three-dimensional computer graphics.

'In order to achieve such high quality images, the hardware must generate images →

Project Un-Reality?

Rumour has it that Silicon Graphics have already pulled out of Nintendo's vapourous next generation home system.

Dubbed 'Project Reality', the much vaunted 64bit graphics engine was to be a joint hardware venture between Nintendo and 3D graphics specialists SGI.

A 3D coin-op is still in the pipeline, employing 3D hardware developed by SGI, but the home system has hit problems.

It appears Nintendo were a little premature in declaring the tie-up and SGI have since decided that it conflicts with their core business.

A major re-think of Nintendo's next step is currently under way, although rumours suggest a more realistic cartridge based 32bit system has started development.

Edge reckons Nintendo should give Atari a call and solve everybody's problems.

Konix from the ashes...

From the ashes of the Konix Multisystem has arisen an exciting new CD-based machine offering impressive technical specifications.

The new console is being developed by Konix engineers MSU in conjunction with TXC corporation, a large Taiwanese company.

Scheduled for launch at the Las Vegas CES, the TXE Multisystem console is said to resemble a domestic CD player, but

The Konix Multisystem: innovative, original... and totally doomed

slightly larger and with a double-speed CD drive.

At the heart of the system is an 80X86 processor – probably an 80386SX clocked at 25MHz – with two further processors sharing the workload, plus a custom CD interface.

The first chip is a Blitter, which performs graphic manipulations and animation effects.

The second is a Texas Instruments DSP, which is used to produce 16bit CD-quality stereo sound. However it can also be used for graphics processing, such as 3D rotation routines. An arithmetic logic unit in the DSP can multiply two 16bit numbers to produce a 32bit result in two cycles; a 68000 takes 70 cycles to do the same.

Little is known about third party developers, but the first titles are said to include *F16*, *Team Suzuki*, *Detox*, *Lotus Challenge* and *Robocod*.

Sony's portable CD-i unit: a token nod towards the standard, and another step nearer their own CD machine

← in real time and the images must respond instantly to commands from the controls.'

It is rumoured that the machine will offer the same level of performance as high-end graphics workstations.

A Sony insider told **Edge**: 'It's more powerful than any machine on the market or in development by a huge margin.'

The feeling in the games market is that whatever Sony is doing has got to be a serious contender. The company has a current turnover of $34,421,707,000, which converts into sterling at over £20 billion. If the firm decided to to throw its weight behind the machine (which it seems certain to do if it regards it as one of its most important launches of the '90s) it could more or less buy the games market.

But **Edge** understands that the new format is being aimed at far broader applications than just gameplaying. As well as the ability to play audio CDs, the capacity to play Digital Video movies from CD is almost certainly being built into the unit.

Sony already

own a vast multimedia empire incorporating Columbia Tri-Star Studios and CBS records. More recently it decided to become a fully fledged games publisher, initiating the Sony Imagesoft label and acquiring software houses like Psygnosis.

A well-placed Sony source explained: 'This is the culmination of many years and billions of dollars of investment. The new machine is just the logical conclusion of acquisitions like Columbia and CBS.'

It seems, then, that whilst the initial announcement has concentrated on the videogaming capabilities of the format, Sony is eyeing the sort of market that 3DO is currently trying to define rather than the one dominated by Nintendo and Sega.

What it may be trying to do, in fact, is wrap the game, audio and video markets up in one machine. And as a Sony insider commented: '3DO's dream of using film studios and record labels to create the ideal multimedia world is wonderful, but a little difficult logistically when you're trying to pull so many different companies together. If you own the movie studios and the record labels, it becomes much more of a reality.'

The new CD

console under development at Sony is not the first games machine built by the firm.

A few years ago it entered into an agreement with Nintendo to make a machine called the Playstation. The idea was that the Playstation would run SNES carts plus a new format, SNES CD. It would be Sony branded while Nintendo would produce a standalone SNES CD drive (like the Mega CD) under its own name. The two products were to be totally compatible.

Neither project ever saw the light of day. It seems that Nintendo got cold feet about CDs and Sony saw no point in launching its Playstation in isolation.

There would certainly have been an outcry from existing SNES owners if they had been asked to pay for the machine they already owned all over again to get their hands on CD technology. A separate drive from Nintendo was crucial to the whole plan.

But the Playstation was built and did get beyond the prototype stage. Apparently 200 finished units are gathering dust in Sony offices around the world.

A source within the firm told **Edge** that Sony also completed one CD title for the machine which was 'absolutely awesome'.

Although the project was scrapped and will never reach the market, the firm is insistent that the Playstation was not a waste of time or money. Many engineers that developed the machine are central to the development of the new console and the Playstation experience, one source claimed, 'proved invaluable'.

With 3DO, Jaguar, Nintendo, Sega, NEC and now Sony all vying for a slice of the market, 1994 could be a very interesting – and expensive – year. E

When is it?

It's the year Nintendo launched their new, next generation machine, promising to deliver an add-on mass storage medium with the capacity for amazing new tites. Gamers went wild and held their breath in anticipation...

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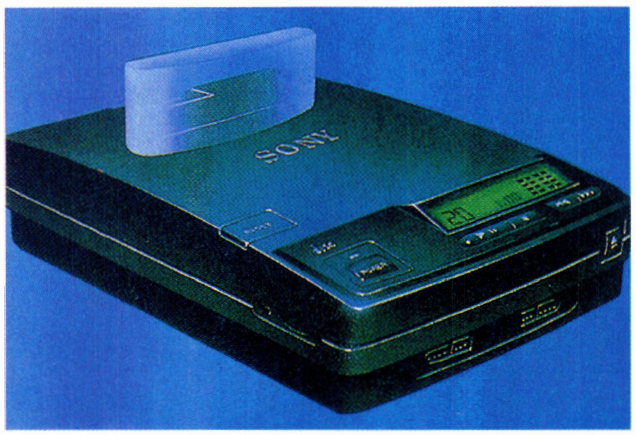
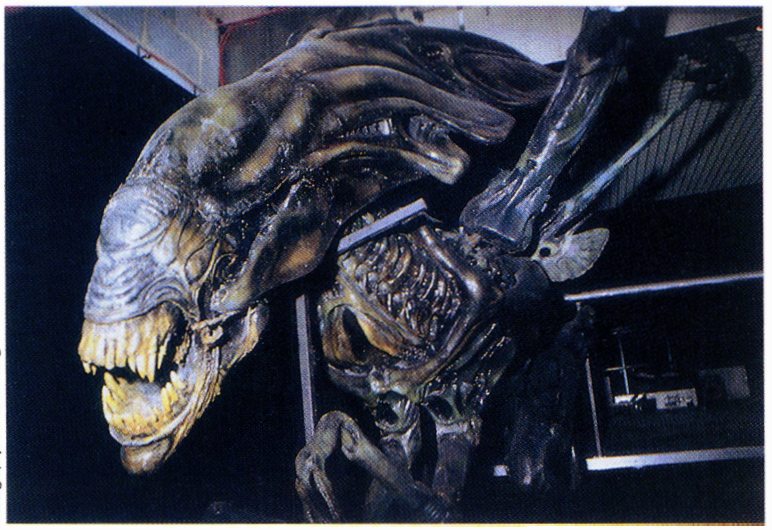


An artist's impression of Sony's aborted Playstation. Whatever their new machine, you can bet it'll be matt black with high build quality

London's Trocadero adds to its many traditional gaming attractions by bypassing virtual reality and going straight for movie props out of actual reality. Alien War spokesman Charles Buggy (does he have a sister named June?) suggests that this level of excitement could cause accidents, but we pull through.

Alien War: first 'total reality' ride?

Alien War is being branded the UK's first 'total reality' ride. But exploring a maze with men in rubber suits chasing you isn't everyone's idea of a great day out... Edge reports



Photography: Peter Canning

A massive Alien Queen at the entrance to Alien War. You get to meet the whole family within the complex, from eggs and face huggers to full blown xenomorphs

The producers of Alien War, the new attraction at the Trocadero in London, have made some big claims. Forget Virtual Reality, this is Total Reality – or so ran the hype. They've promised a new era in public entertainment, a participatory experience to scare you out of your wits, or to put it in the words of American venture capitalist **Charles Buggy**, 'I hope you brought a change of drawers'.

Alien War follows on from the movie Alien 3. The story is that the Weyland-Yutani Corporation have managed to get a face hugger back to Earth, having captured it for the Bio-Weapons Division. The aliens are being held in a Research Utility and you are set for a tour through the alien's life cycle. At the beginning of your tour, something goes wrong (of course) – aliens are on the loose and you only have 15 minutes to escape the labyrinthine installation to safety.

The experience is that of a sophisticated ghost train on foot. Colonial Marines drag and bully you through the complex, hurrying you past aliens and shooting at them. The public play themselves – civilians caught up in the movie. The maze itself is closely based on the sets from Aliens, and much of the scenery is taken from the original vacformed panels constructed at Pinewood studios.

The Colonial Marines guides were selected from hundreds of applicants, and are a burly bunch. After an intensive two week training course and crewcuts, they really look the part. Their heavy body armour is made out of fibreglass from casts provided by Twentieth Century Fox. The Marines also carry huge assault rifles taken straight from the film, plus blank-firing nickel plated Barretas. The participants don't actually get to discharge any weaponry themselves – all the seriously loud fire power is taken care of by the Marines.

An additional member of the group is an anonymous screamer, planted in your midst to heighten the excitement. At one point in the maze, a lift breaks down and the doors are forced open by an alien who drags the screamer out (assuming his comrades let him go, of course). The aliens within the maze

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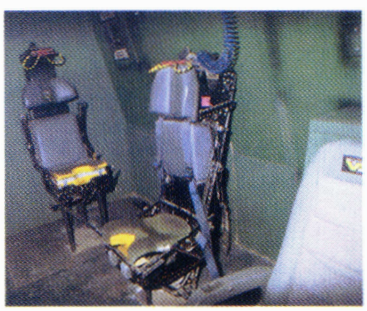
Sigourney Weaver, suitably terrified after her ordeal...



'One of those things has gotten in here. Check under your seats!' your Colonial Marine escort advises...

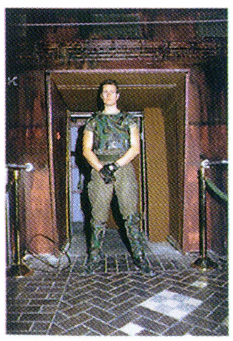
Data stream

Nintendo worldwide sales, fiscal year 1992: **$4.843bn**[1]
Nintendo worldwide sales, fiscal year 1993: **$5.471bn**[1]
Sales in Japan and US of *StarFox* in first month: **1.7m**[1]
Percentage of videogame sales made to consumers under the age of 15: **70**[1]
Annual US cinema attendance: **1.2 billion**[2]
Annual US cinema revenues: **$7 billion**[2]
Growth in US cinema attendance: **0%**[2]
Annual US amusement park attendance: **375 million**[2]
Growth over last ten years in US amusement park attendance:**15-20 million**[2]
Annual amusement park revenues: **$8 to $10 billion**[2]
Total value of UK Sega and Nintendo magazine market, 1993: **£21,831,524**[3]
Total value of UK Sega and Nintendo magazines produced by Future Publishing in 1993: **£9,396,217 (or 43%)**[3]
Percentage of US consumers who said they would buy an interactive TV: **67**[4]
Percentage of US consumers who already own cable TV: **80**[4]
Percentage of US consumers who said they are interested in video-on-demand: **73**[4]
Percentage of US consumers with a videogame system: **40**[4]
Worldwide sales of *Street Fighter II* since launch, June 1992: **6,000,000**[5]
Number of Capcom cartridges sold on SNES worldwide in 1992: **10.6m**[5]
Copies of **Edge** four printed: **52,370**

Sources [1]Nintendo of America; [2]Cinewerks, Winter 93; Iwerks Entertainment in-house magazine; [3]Future Publishing based on cover price multiplied by audited circulation figures; [4]Dataquest Survey of 200 American households; [5]Capcom President Kenzo Tsujimoto, quoted in Nikkei Weekly

A typically burly Colonial Marine brandishes an assault rifle with attached grenade launcher, an original prop from the movie Aliens

One of the very scary latex suits, as used in the movie Aliens



A Marine stands sentry at the entrance to the Alien complex

appear both as models and fully mobile figures, again using kit supplied by Twentieth Century Fox. The animated models range from an alien head complete with secondary mouth and dribbling slime, to an unconvincing face hugger which just dangles from the ceiling.

In an era where interactive entertainment is on the rise, what role will Alien War actually play, seeing that it offers very little actual interaction beyond sliding a door open? **Gary Gillies**, the brains behind the venture, thinks it has its part to play. 'Everybody's shooting lasers around or sticking Virtual Reality helmets on their heads. We thought we'd try a completely new thing and do Total Reality. You're not sitting on your backside looking at a film – you're actually taking part in it.'

But in spite of his efforts, Alien War feels like it lacks innovation. The effort to stimulate all senses falls far short: there's no smell inside the complex other than dry ice, and the sound effects have a limited range, including mainly sirens and a throaty rumble whenever an alien is about to appear.

But was it actually scary? **Sigourney Weaver** who said she was 'personally not very brave' before going in, only said 'It was a lot of fun!' when she came out.

And as for **Edge**, we reckoned being cooped up with a hysterical crowd in a maze was more scary than being chased by burly men in rubber alien suits. Still, thankfully the **Edge** 'drawers' remained largely unsullied throughout...

Datebook

December

Computer Shopper Show Christmas '93: Thursday 2nd-Sunday 5th December, Grand Hall, Olympia, London. (071-373 8141). Tickets £7 adults, £5 kids (cheaper when booked in advance). Open 10.00-6.00 Thurs-Sat; 10.00-5.00 Sun.

January '94

Consumer Electronics Show, Las Vegas: Thursday 6th-Sunday 9th January, The Show Centre, Las Vegas, Nevada USA organised by Consumer Electronics Group of Electronics Industries Association. (0101 202-457 8700). Former trade-only event is now open to public.
ATEI: January 25th-27th, Earls Court, London. Contact BACTA, Regents Wharf, 6 All Saints Street, London (071 713 0302), Trade show only.

February

Virtual Reality '94: Novotel, Hammersmith, London (071 976-0405). Feb 1st-Feb 2nd, Open from 9.30-5.00. Tickets £10 on the door. Trade free.

March

AOU Show, March 2nd-3rd. Japan Convention Centre, Makuhari Messe, 2-Makabe Chiba-shi, Chiba, Tokyo (010 81-3-866-9371)
ACME show. March 17th-19th. O'Hare Exposition Center, Chicago, US. For further details call 0101-708-333-9292.

April

International Computer Show: Friday 22nd April-Sunday 24th, Wembley Exhibition Hall (0222-512128), Open 10.00-6.00 Fri-Sat, 10.00-4.00 Sun. Tickets £7 adults, children under 10 £5. Advance ticket discount.

Show organisers: if your show isn't listed here, it's only because you haven't told **Edge** about it. Do so on 0225 442244, or fax us on 0225 446019, or send details to **Datebook, Edge, 30 Monmouth Street, Bath, Avon BA1 2BW**

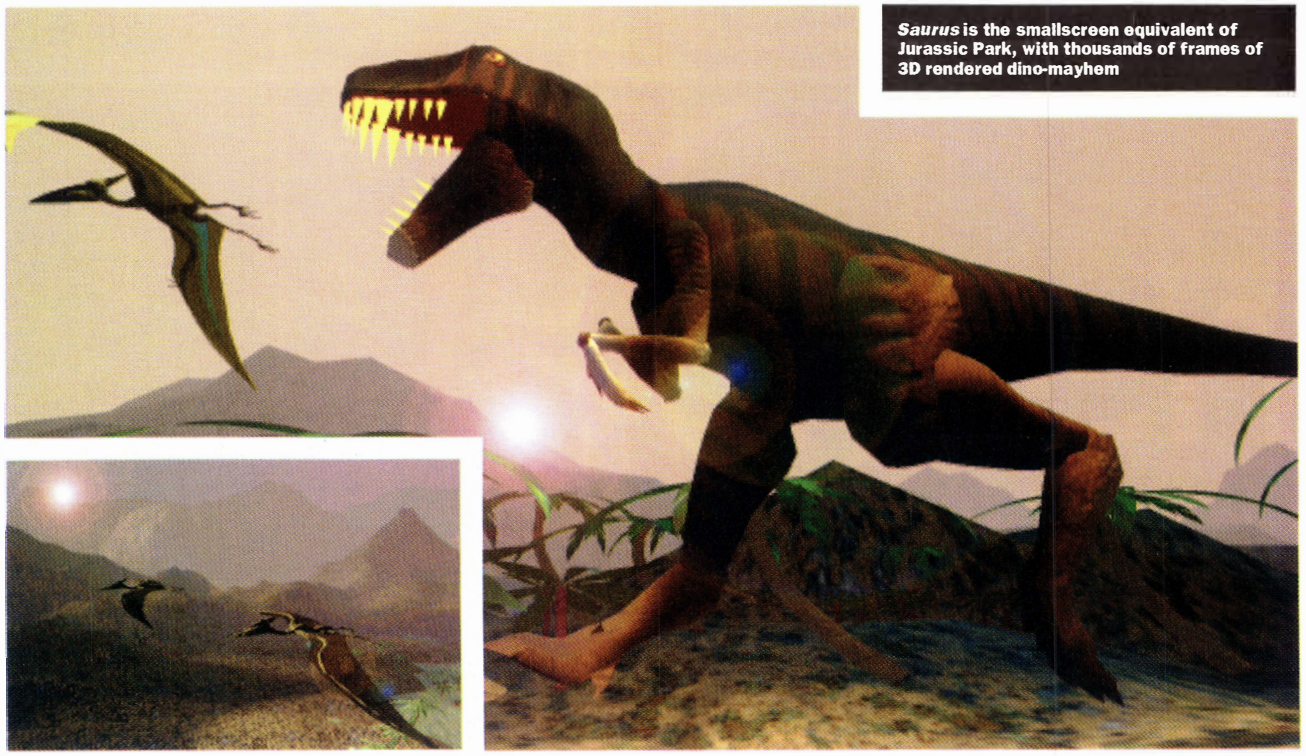
Just the job?

Tired of your nine-to-five? Fancy making big bucks in the videogames industry? Well, we know the feeling, so here's our selection of the best openings around at the moment. But don't call **Edge**, call them!

Professional animators, 'no previous computer or videogame experience necessary. But must have a proven track record in professional animation.' Probe Software Tel: (081) 680 4142
Games Programmers, 'first class programmers, proven track record in 8086, 68000, 6502 or Z80'. Codemasters. Duncan Kershaw. Tel: (0926) 814132
Graphic artists, 'experience with with 3DS or Alias software running on Silicon Graphics. Or a strong portfolio of Amiga/ST artwork'. Rob Groves, Microprose, The Ridge, Chipping Sodbury BS176AY
Software engineers, 'Amiga/68000 assembly programmers to work on wide range of formats'. Microprose. (address above)
Games designer, 'Highly creative person, able to communicate ideas clearly. Good understanding of how computers work, and an excellent knowledge of games across all formats' Microprose. (address above)
Programmers, Graphic Artists, Designers, Project Managers, 'Salaries range from £10,000 to £40,000. Applicants for all positions must have completed at least one commercial product, and have suitable experience...' Stephen Lloyd Davies, Aardvark Swift Ltd, 75-77 Station St, Swinton, South Yorks S64 8PZ

For more jobs see page 87

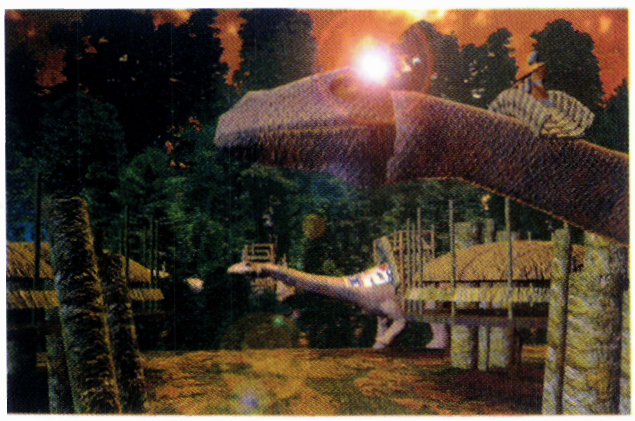
Clearly the future of gaming lies in expert use of prerendered 3D sequences, whether they appear in point-and-click adventures, RPGs or racing games. At least that's how Cryo Interactive sees it, as it sets about filling *entire* game CDs with graphical data. Autodesk's 3D Studio package looks like it could be a tool to watch...



***Saurus* is the smallscreen equivalent of Jurassic Park, with thousands of frames of 3D rendered dino-mayhem**

The Cryo game

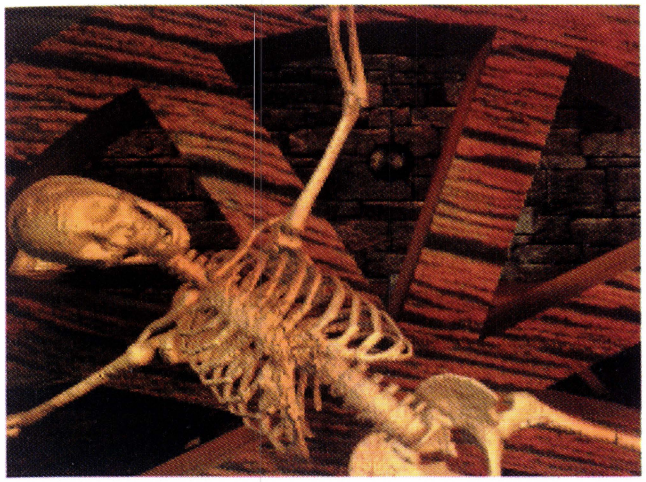
The argument that CD-ROM just isn't interactive could well be quashed by French coders, Cryo. With their new CD-ROM titles, they're proving that graphics *are* everything. **Edge** explores



Once allegiances with the gentle herbivores are formed, the player has a useful mode of transport between his bases

Cryo are fast becoming synonymous with CD-ROM development. Their three latest titles – *Saurus*, *Dragontales*, and cover star *MegaRace* – all use similar systems of bolting gameplay onto pre-rendered graphics streamed off CD – and if nothing else, they all look gorgeous.

Saurus contains some of the most enigmatic images **Edge** has seen for a while. This PC CD-ROM title is set in a land of legend, where humans and dinosaurs co-exist. The story follows your character's efforts to form



Dragontales **plunges the player into the familiar world of dungeons, mazes and spellcasting. Fast becoming de rigeur in adventure games, all the scenery is pre-rendered and stored on CD. However, Cryo are intent on realising everything this way – including all the characters you meet**

allegiances with peaceful herbivores like the Diplodocus, in order to do battle with the violent meateaters: Tyrannosaurus Rex and co.

Jean-Martial Lefranc, founder member of the 50-strong Cryo team, expands: 'You first have to discover what your destiny is; then you must find out how to make the good dinosaurs ally with you. Then you go and fight against the bad dinosaurs.

'It's an adventure game in a rendered environment, but you are able to move around this environment, meet characters and interact with them. It's a point and click interface: it's different but it's going to have the look and feel of *The 7th Guest*. The big cinematic scenes are included as part of the scenario.'

These cinematic sequences should be the game's major lure. Since August of last year, a ten-man team has been modelling and animating dinosaurs in Autodesk's *3D Studio*. One sequence can take as long as 48 hours to render and there are about 50 rendered sequences, each lasting between five and 20 seconds apiece at 24 frames per second. With around 18,000 frames, it's no surprise that Jean thinks the 'CD is completely full!'

With the appearance of the movie Jurassic Park – which Jean admits will help the marketing of *Saurus* – Silicon Graphics workstations have been all the rage. 'We have some Silicon Graphics machines already,' says Jean, 'but the real issue in using SG machines is the definition you want to end up with. I think it's useless using Silicon Graphics to do VGA images, but as the new consoles approach broadcast definition it starts making sense.'

Saurus goes on sale in the Spring of '94 and is published by Virgin.

Since August of last year, a ten-man team has been modelling and animating dinosaurs

Cryo's second project is an RPG in the Dungeons & Dragons mould, being developed for Mindscape on PC CD-ROM. One could be forgiven for thinking this an oversubscribed genre, but Jean is confident that this game is different.

'The main innovation in *Dragontales* is that you're going to be

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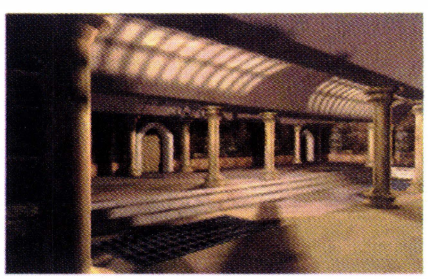
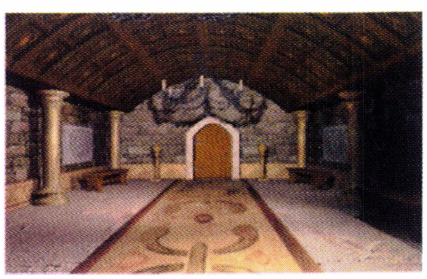
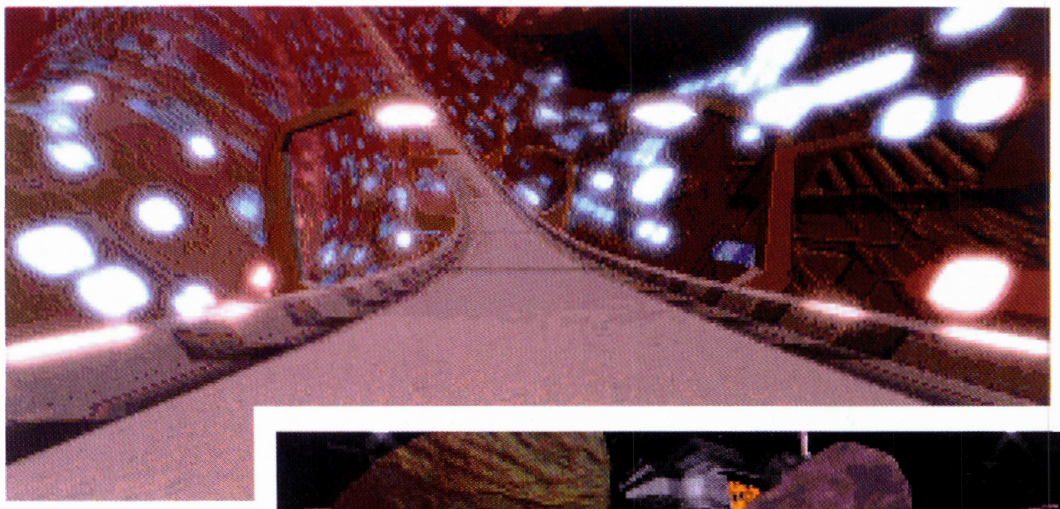
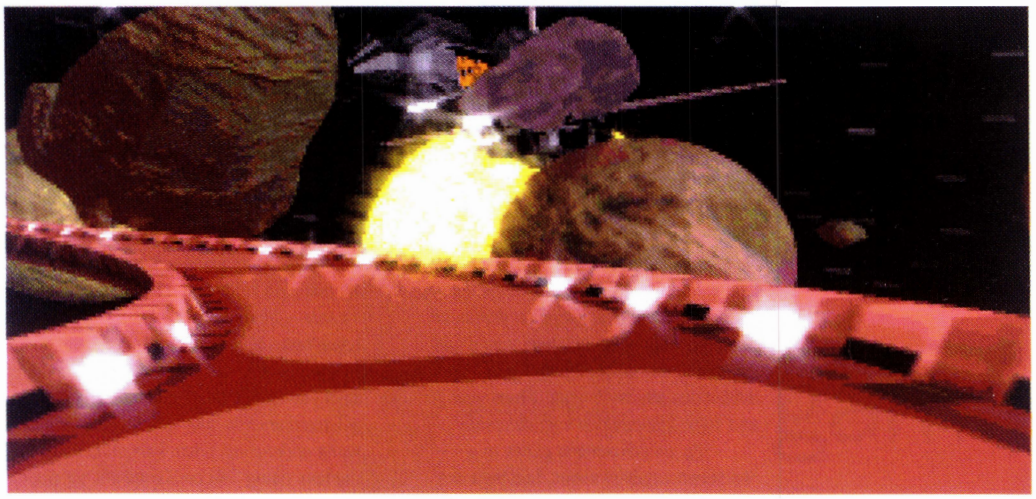




All these images from ***Dragontales*** **were produced using** ***3D Studio*** **on the PC, and make the scenery in** ***The 7th Guest*** **look like it was done on** ***Mario Paint*****. Of course, rendering stills is a doddle; making them move fluidly within a game structure is another carton of worms entirely**



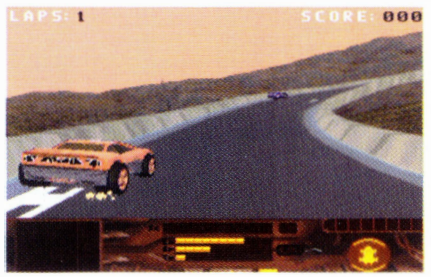


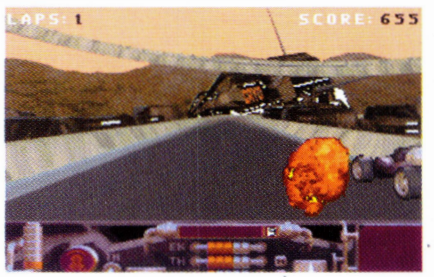
The beauty of using CD-ROM to store the tracks for *MegaRace* is that you can do what you like. Unfettered by the restrictions of 3D polygons, your racetrack can be in the middle of a neon city (top) or in an asteroid belt (above)

able to interact realtime with 3D generated characters in a 3D generated environment,' he explains. 'The backgrounds and characters are all rendered; they are quite detailed. The issue here was to develop a zooming system that allows you to interact with the characters – we've produced images of the characters as seen from various points of view.'

Dragontales should be dropping jaws when it hits PCs in the new year.

Destined for PC-CD ROM, 3DO and Mega CD, *MegaRace* is possibly Cryo's most technically proficient product. Jean explains, 'The idea of the game was that the racetrack and surrounding scenery was rendered, and that the cars are put on as sprites. The big technical trick is to have the sprite follow the rendered track as you play, and getting the car to go away from you or getting closer, as you race.





The main problem Cryo encountered with *MegaRace* is the sheer volume of sprites needed to realistically portray the player's car, and all the other cars on the course. There are a number of different vehicles at your disposal, each one with different handling characteristics – and dashboard

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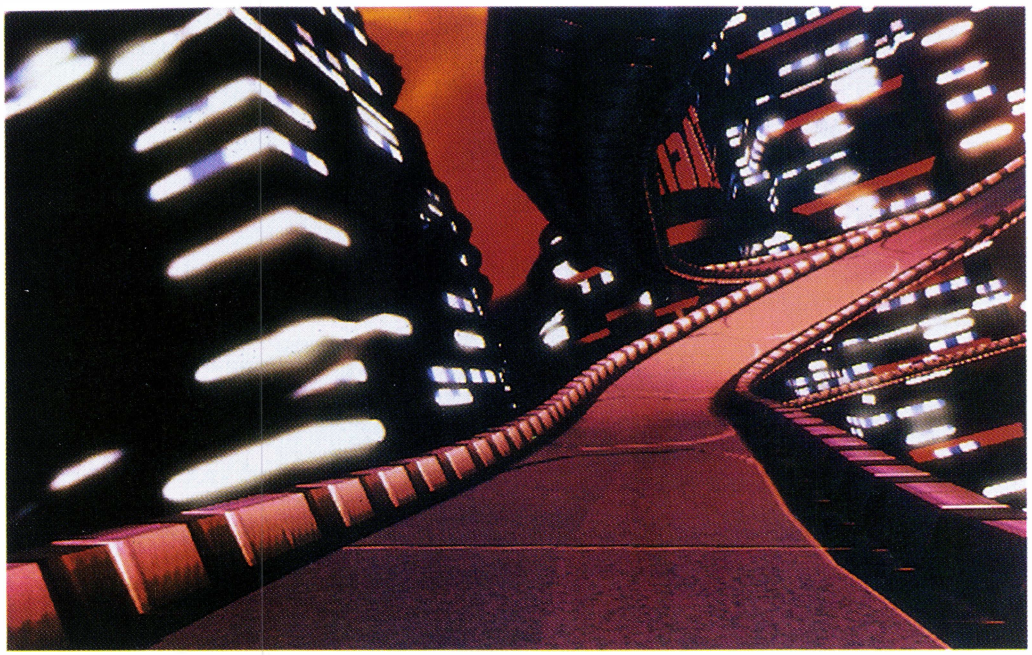


***MegaRace* on 3DO should certainly give *Crash 'n Burn* a run for its money. The extra colours afforded the Panasonic machine certainly make a difference; and the beauty of CD means designers don't have to skimp on scenery...**

'The big technical trick is to have the sprite follow the rendered track as you play'

Like *Silpheed* or *Kether*, the scenery always remains the same – but Cryo have managed to incorporate a high degree of interactivity into what is essentially a non-interactive system.

'You have to store the relative position of the car to the track, because the track actually interacts with the car,' attests Jean. 'What happens is that track contains zones that affect your car: you can get booster points, a weapons point, a braking point, and the car even spins when you cross a certain zone. The bulk of the game code enables the sprite car to interact with the pre-calculated background.'

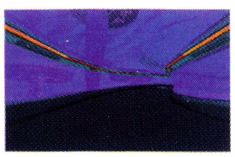
And, of course, speed is of the essence: the program cleverly increases or decreases the number of frames displayed per second to give the impression of acceleration or deceleration, accordingly.

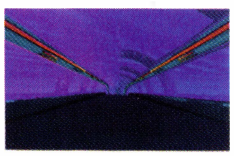
Difficult as this may sound, Jean maintains that the car is the more technically difficult element: 'Because the car is seen from lots of different angles, you have to hold lots of different sprites in memory. That takes up the most RAM space, so we've had to find a tool that would provide very effective compression of each frame.'

There are 17 tracks in *MegaRace* (plus a few hidden ones) and a single lap can take anything from 20 to 60 seconds. To keep the scenery shifting at a decent rate, image compression squeezed each frame down to just 5K.

Given that *MegaRace* is 3DO bound, comparisons between it and *Crash 'n Burn* are inevitable. 'I think *MegaRace*'s graphics are going to be a lot better,' says Jean. 'The gameplay is going to be a lot deeper, and I think the acting on the video will be a whole lot better, although we haven't got the same amount of budget to spend on so many wigs!'

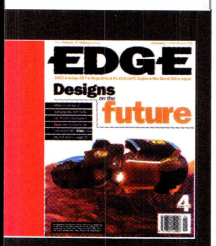
A scene-setting shot of one of *MegaRace*'s 17 tortuous tracks





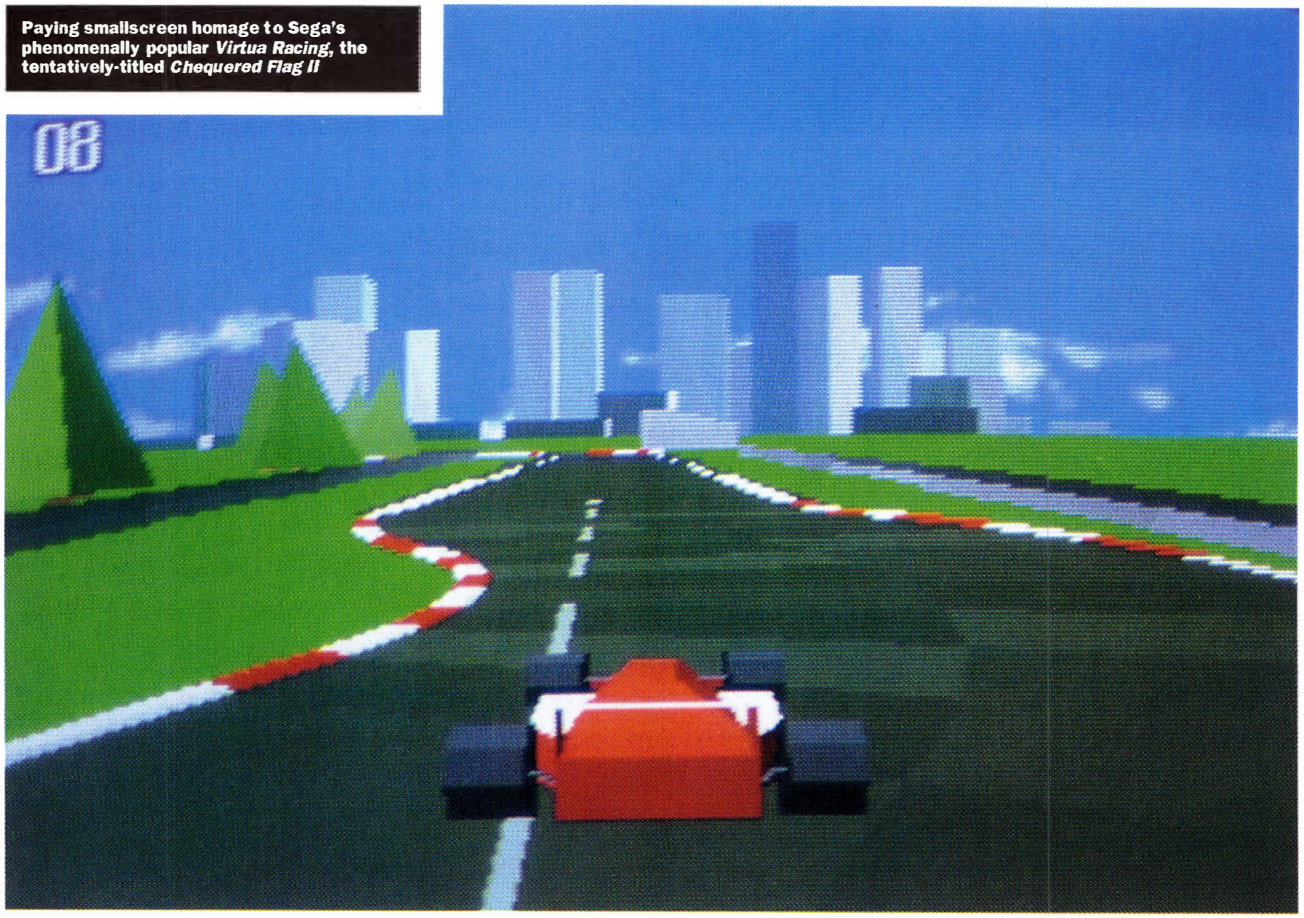
While some interactivity might be lost in using a CD-ROM system, you can certainly show things that no home machine could handle in polygons. The next closest thing to this is actually being there...

A glorious option screen from the 3DO version. The main difference is colours: the PC version is 256 while 3DO can handle 24bit colour

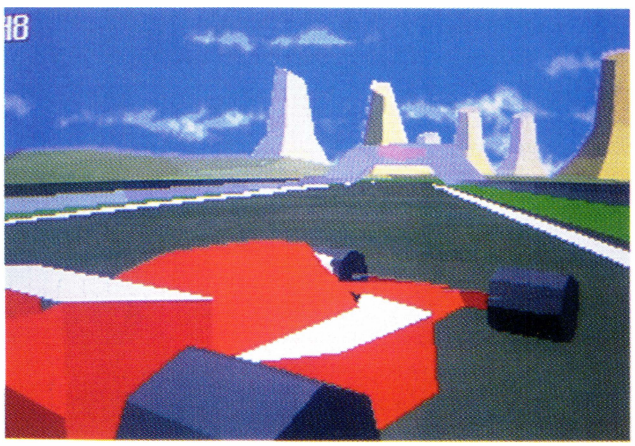


With Sega's *Virtua Racing* still doing good business in arcades, it's little surprise to see a me-too title on Jaguar, which is no slouch when it comes to throwing around flat-shaded polygons. It's not bad with the textured variety, either, as *Aliens Vs Predator* illustrates. And an AVP FPS could work a treat...

Paying smallscreen homage to Sega's phenomenally popular *Virtua Racing*, the tentatively-titled *Chequered Flag II*



Rebellion Software



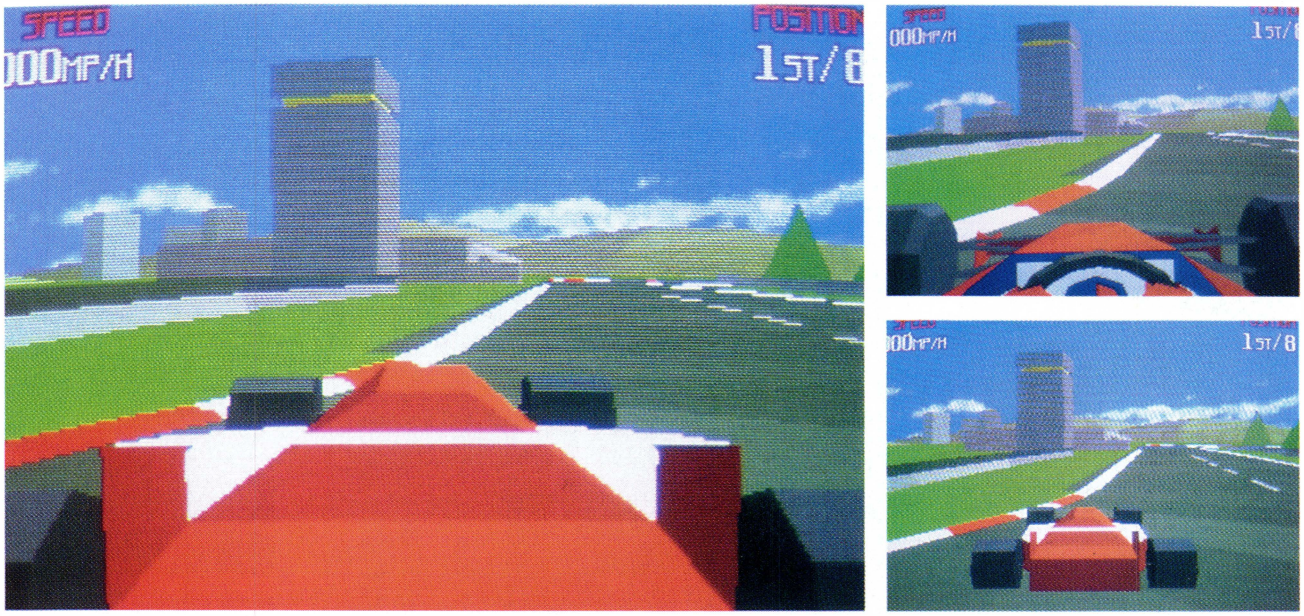
The external views are by far the most appealing aspect of *Chequered Flag II*. Pressing a button zooms you out from behind the car

If Atari's Jaguar takes off, Oxford-based developers, Rebellion, will be one of several teams pinning their hopes on a rosy future for the machine.

After attending a conference around a year ago, where Atari dangled the Jaguar's tempting specs in the faces of various developers, the nine man outfit was commissioned for two games – a polygon-based driving game, *Chequered Flag II*, and a firstperson perspective adventure/shoot 'em up based on the *Aliens vs Predator* licence.

Edge asked Rebellion's creative

As Atari's licencees start to crawl out of hiding, **Edge** visited Oxford-based developers, Rebellion, for a look at two new titles...



A selection of shots from *Chequered Flag II* shows the different perspectives available. The in-car viewpoint (top right) keeps those driver's hands firmly in view – they're just polygons like all the other graphics in the game. As far as smoothness goes, though, there's still work to be done

director, **Jason Kingsley**, about the console and its potential. 'It's superb, and so much of a step up from previous consoles. Even comparisons with PCs are favourable. I'd say, that speed-wise in 256 colours, a 486 DX2 (66MHz) PC will just about match the performance of the Jaguar. But then the Jaguar will probably be able to

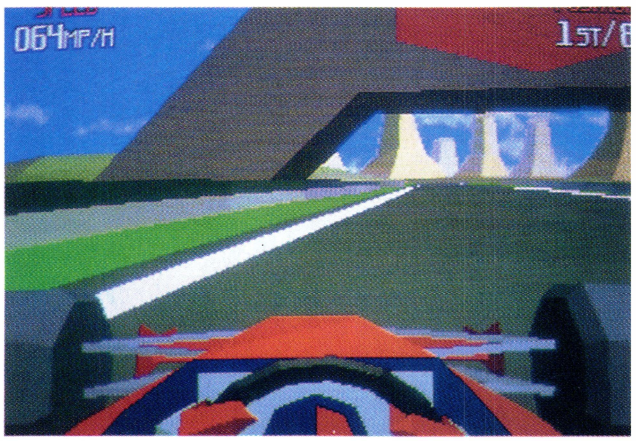
'The Jaguar's superb, and so much a step up from previous consoles.'

Note how the driver's arms animate as he turns the wheel. It's a nice effect that works well

offer the same speed in 16 or 24bit colour. Of course, there are always things you'd like to be changed with a new system, but that's going to be the same with every system ever released. For the foreseeable future, this is a great platform to work on.'

Aliens vs Predator, the more complete of Rebellion's two games, looks slick, boasting texture-mapped 3D corridors and smooth scrolling. However the graphics weren't created in the usual way. Instead of being drawn on the screen in the traditional manner, Rebellion opted for model-making techniques, constructing small panels to make up the walls, floor and ceilings, and using latex models for many of the sprites. These were then photographed and digitised for inclusion in the game. 'Funnily enough,' Jason adds, 'we thought the process would take longer than drawing everything, but it actually worked out quicker.

'We also dressed someone up in the actual costume that Hicks wore in the Aliens movie and then photographed and digitised him for a sequence of animations. Of course, all these graphics eat up a lot of space, and even with the Jaguar's



Rebellion maintain that, despite the simple polygons, the graphics here are just as technically advanced as those in *Aliens vs Predator*

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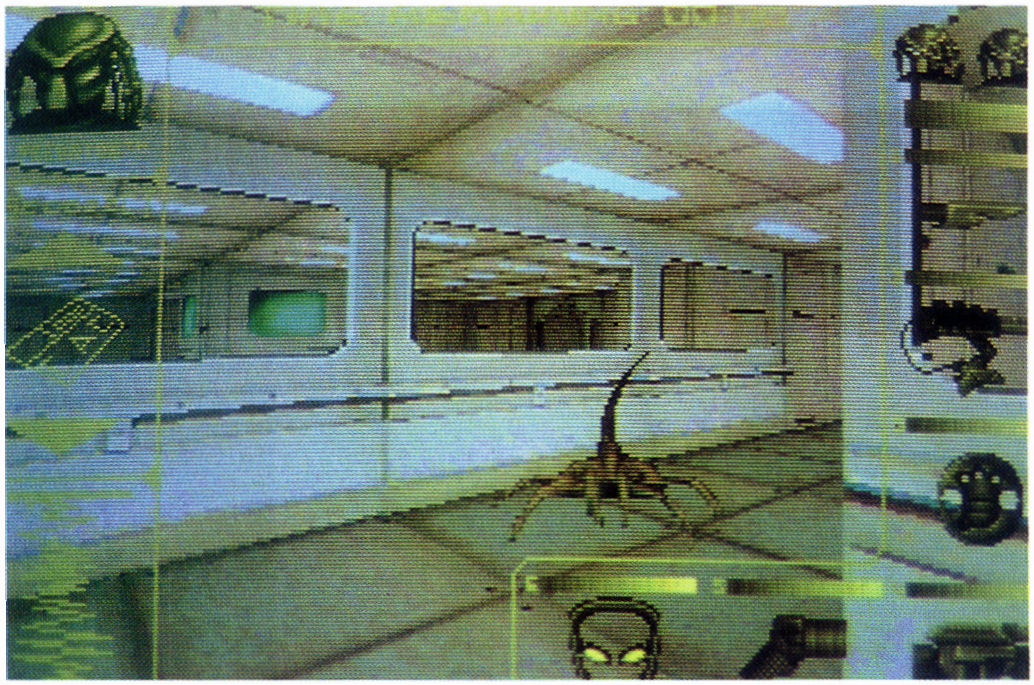


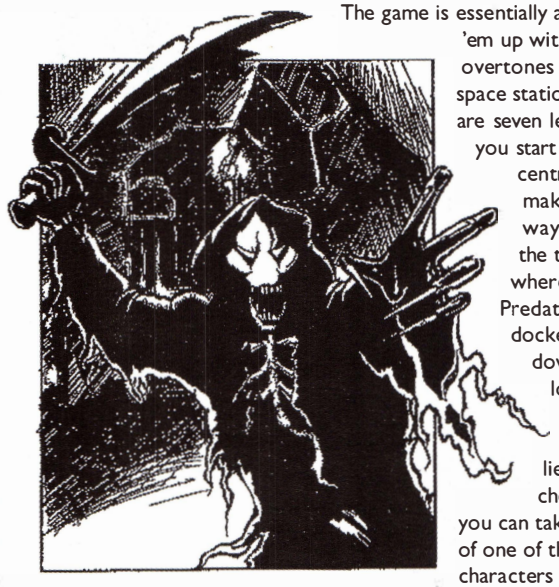
The most impressive aspect of *Aliens vs Predator* is the way you see through the windows and doors into the other rooms. The whole environment is texture-mapped, and when you see it move it's pretty damn impressive too

Continued

compression, we're restricted more than we'd like to be. We're working on 2Mb cartridges for the first two games, and you still can't put a lot of 16 or 24bit colour bitmaps into such little space.'

The static screens in the game use 24bit colour – over 16 million colours – while the bulk of the game uses 16bit colour which displays around 65,000 colours onscreen.

The game is essentially a 3D shoot 'em up with strategic overtones set in a space station. There are seven levels, and you start on the central level, making your way either to the top floor where the Predator ship has docked, or down to the lowest level, where the Alien ship lies. It's your choice, and you can take control of one of three characters – either an Alien, the Predator, or a Colonial Marine. Playing a Marine, your objective is to rescue your troops and, obviously, get rid of all the aliens and predators. Playing an alien or predator involves taking out the opponent's ship while collecting as many dead Marines as possible!



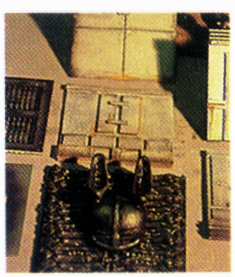
Much further down the road is *Dungeon*, the working title for a firstperson adventure

At the time of our visit, the game was a few weeks from completion and looked extremely good. A lot of thought has gone into the layout of the station – offering players multiple routes and lots of secret locations to discover. The 3D scrolling was fast and smooth – currently running at between 12 and 15 frames per second. And while this isn't quite as smooth as some of the newer DX2 RPGs, the level of detail and depth of vision more than make up for it.

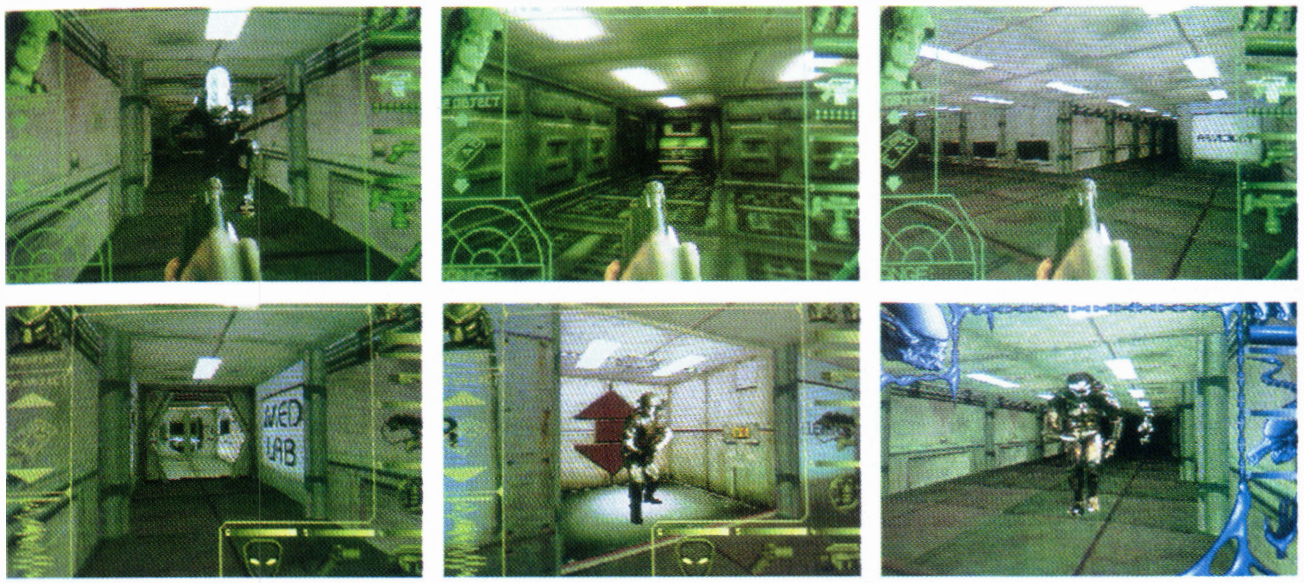
The only thing that was missing at the time of the visit were the 16bit samples, also being handled in-house. When compared to Activision's sad *AVP* beat 'em up for the SNES, this looks like being the first game to do justice to the licence.

Rebellion's other project in development, currently codenamed *Chequered Flag II*, is less impressive however. Some aspects of the game are great – particularly the look of the depth-cued graphics and the choice of perspectives. By using plain polygons,

'The Jaguar's power has truly great potential for detailed real-time 3D scenes.'



The model panels for AVP's interiors were shot and then digitised



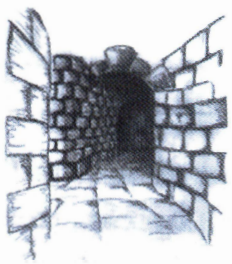
Each character has his own onscreen interface. Top left: A Colonial Marine takes on an alien face to face. Top centre: Open spaces give a much wider perspective. Top right: Even in the distance, the detailed texture-mapped writing is clear to read. Bottom left: Inside the head of the Predator looking through a doorway. Centre: A Colonial Marine awaits to exit a lift bay. Bottom right: Inside the Alien and with a Predator clearly in view

the game tries to emulate *Virtua Racing* – which is no bad thing in itself – but **Edge** reckoned the car was decidedly tricky to handle and the slightly sluggish frame rate spoils the 3D effect. To be fair, the developers said there's still a fair amount of work to do, and they're recoding an important part of the polygon routine which should push the frame rate up significantly. The width of the track will increase too – something that needs to be done if the comparisons with *Virtua Racing* are to be borne out.

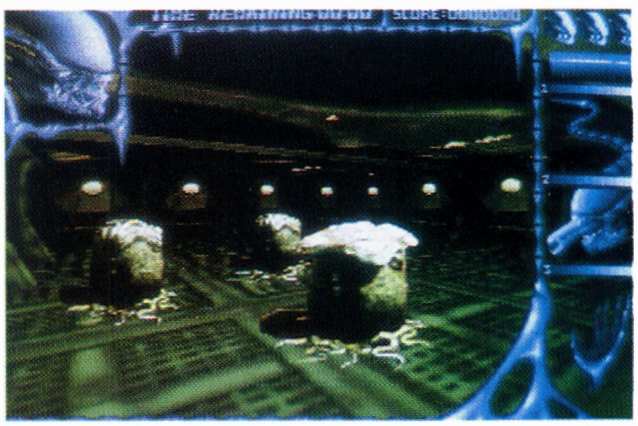
There are two other projects in the pipeline at Rebellion, but both are still in the early design stage. The first, a 3D dungeon game using the *Aliens vs Predator* graphic engine, will be in the mould of the *Ultima Underworld* games including skeletons – again digitised from models – and all manner of typical fantasy creatures.

The other game's a combat flight simulator set in a futuristic Cyberpunk-style city. The intention is to create a Bladerunner-esque environment, including effects like smog and neon lights.

'The thing about the Jaguar,' Jason reckons, 'is that its power has truly great potential for detailed real-time 3D environments. We're really pushing to make the games as interactive as possible.' **Edge** only wishes more developers would do the same. Expect both games to appear for the Jaguar sometime around January. E



A model skeleton and a preliminary sketch. Both from *Dungeon*



Even the eggs were modelled in latex before being photographed and fully digitised

REBELLION

Credits

Creative Director: Jason Kingsley
Programmer (*AVP*): Mike Beaton
Programmer: Andrew Whittaker
Programmer (*CFII*): Rob Dibley
Graphics: Toby Harrison-Banfield
Graphics: Stuart Wilson
Graphics (*CFII*): Justin Rey
Sound: Chris Kingsley

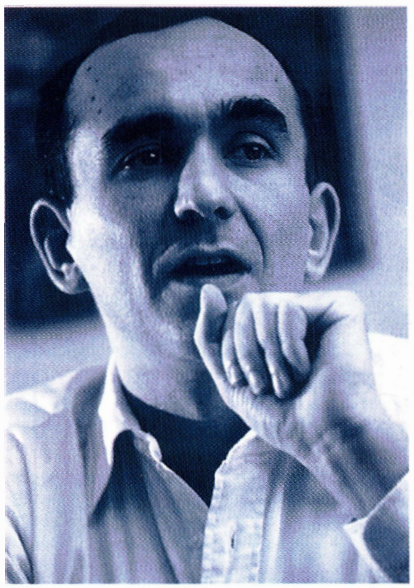
At Bullfrog in Guildford, a revolutionary animation system is being tested for *Magic Carpet*, using a special suit covered with sensors. It won't be long, you'd think, before someone comes up with a catchy name for it. Then there's the version being coded for 3DO's custom-built 3D glasses...

Photography: **Stuwart Whale**

Peter Molyneux: some might say he looks at the world through rose-tinted glasses...

Funtime at Bullfrog

Bullfrog's Peter Molyneux is the man behind some of the most successful videogames ever. **Edge** reports on his new projects, *Theme Park*, *Creation* and *Magic Carpet*



'Our philosophy is to create games not just for people who play loads of games, but for those who don't normally play at all'

Peter Molyneux, MD, Bullfrog Productions

For the past seven years Bullfrog have been at the forefront of British software development. The Guildford based company has been responsible for some of the most ingenious and intricately designed software titles to date. Past efforts, *Populous*, *Powermonger* and the more recent hit *Syndicate* prove this. Indeed, you'd be hard pushed to think of a badly written game brandishing the Bullfrog logo.

Peter Molyneux, the eccentric and successful founder of Bullfrog, is hoping for continued success with three new titles planned for release early next year: *Creation*, *Theme Park* and *Magic Carpet*, and only one of the three is even remotely 'god' based.

Although Bullfrog's games contain huge complexities, it's the ease with which those complexities are made accessible to the player that makes the games so successful. Peter explains, 'Our philosophy is to create games not just for people who play loads of games, but for those people who don't normally play at all. I mean, people can't really associate with a hedgehog running around a screen. We've used this philosophy with *Magic Carpet*, and all our games in fact.'

Magic Carpet has a distinct Arabian

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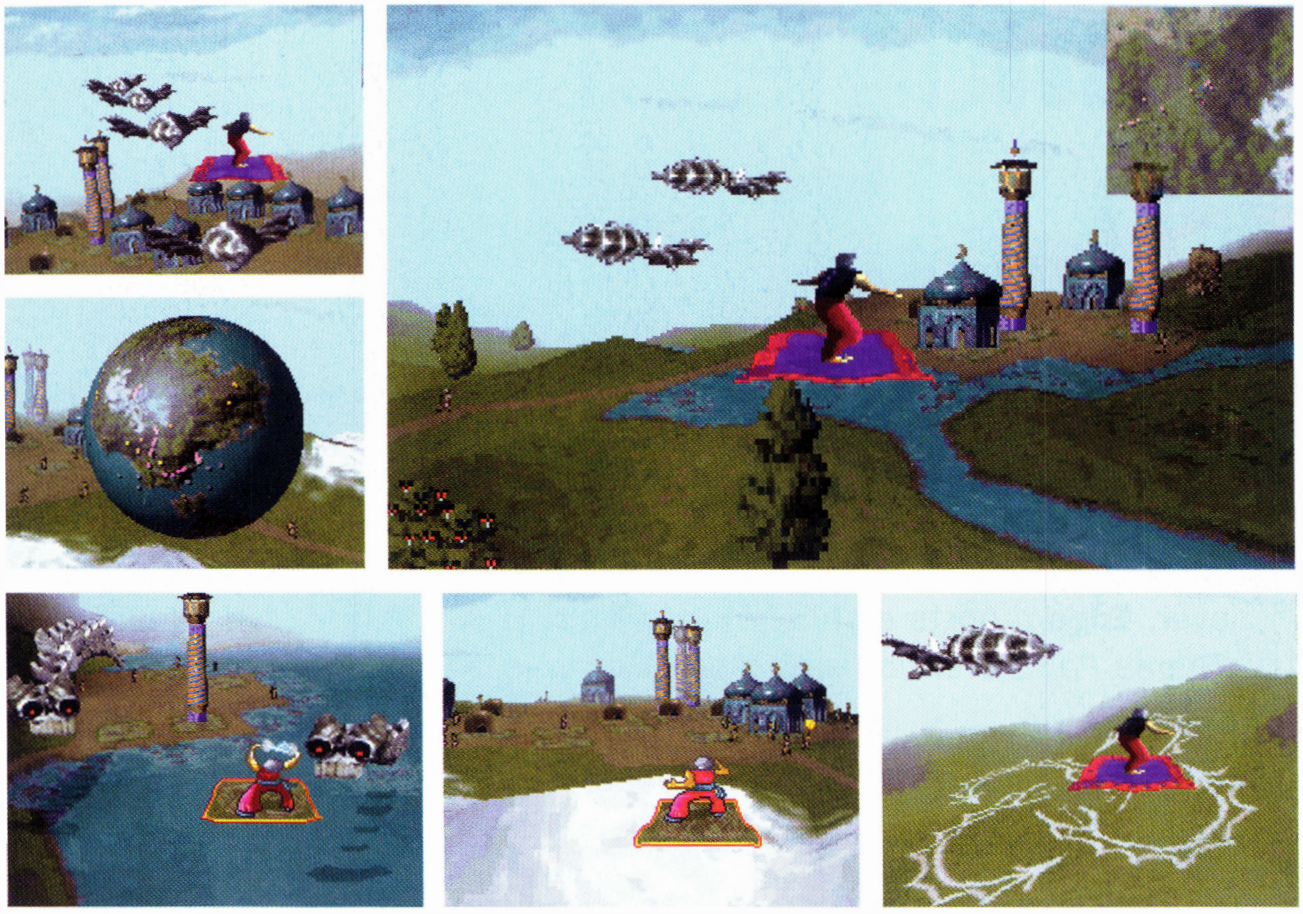

Magic Carpet **thrusts you into a completely three dimensional Arabian Knights world. Unlike some games, Bullfrog have given you total freedom within this environment. The system used to generate these landscapes is a hybrid of the system used in *Populous*. Each landscape is individual and is generated by randomly adjusting its parameters. The data and variables for each landscape are compressed into just 56 bytes**

'*Magic Carpet* is sort of like a flight simulator but with any of the hassle of flight simulator controls...'

Knights look and feel. The story goes that you have fallen in love with a prince or princess (you can choose), and a Sultan has set you several tasks. Your character is sent down into a dungeon full of magical treasures, and he picks two to help him on his quest: a genie and a magic carpet.

According to Peter, '*Magic Carpet* is sort of like a flight simulator, but without any of the hassle of flight simulator controls, and it's set in an environment that people can easily understand.'

In creating the landscape, the computer is generating a completely fractal world. 'What we wanted to do was to create a flexible and easy to use environment in which you have total freedom', Peter says. Indeed, the world is so accessible that is possible to fly anywhere you want. You can fly high into the sky, skim the surface of the ocean or even fly through towering canyons.

The landscapes look incredibly realistic and the attention to detail is quite astonishing: even the sea moves up and down the shore. Peter explained 'What we've tried to do is make this world as real as possible, because nowadays it's the little things that make all the difference. So for example, everything in the world has shadows – the birds, the trees, the dragons, the carpet, everything. As time passes and the sun comes down, so all the shadows move accordingly. I don't think this has been done on the PC before.

'The sea level follows all the moon patterns, so the tide will actually move up and down according to the time of day it is. This obviously hasn't got a huge relevance to the game but it shows the kind of world we've created.'

Glenn Corpes is the main programmer behind Magic Carpet and he was responsible for getting the 3D world to look and move as it does. Glenn says, 'I was responsible for the 3D routine. It took around two months to generate a landscape and another three months to get things like trees moving around properly on that landscape. Some games that look

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similar have used a technique called Voxen Space. But this technique takes up far too much memory.

'A similar map created via Voxen Space would have taken upto two megs of memory. One of my maps only takes up 256K.' Glenn – who has been with Bullfrog since the start, and worked on projects like *Populous* and *Power Monger* – is happy with his efforts so far, but feels he's now found an even better way of doing it.

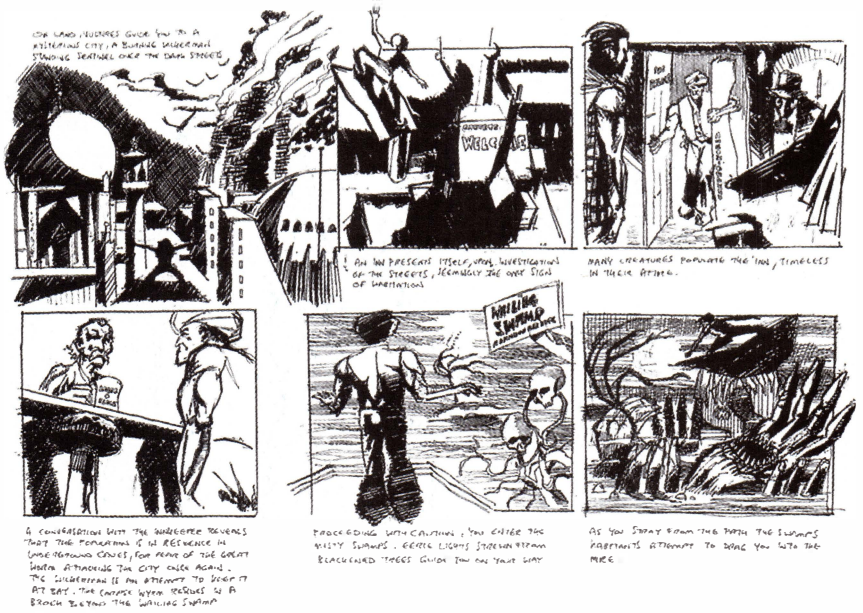
According to Peter, 'The landscape is constructed purely of polygons. After we place down the polygons, we texture map them and then add Gouraud shading on top of that. The next stage is to depthcue the whole lot and then finally put the fog down. The reason behind the fog is twofold. Firstly it obviously looks quite nice, and secondly it means that we don't have to draw too far.'

Although the landscapes look very impressive, especially in the hi-res version, the in-game characters – at this stage at least – look rather crude. Some high powered graphics equipment is needed to improve them, and sure enough a Silicon Graphics workstation is Guildford bound.

There won't be a problem in translating the graphics as everything in *Magic Carpet* has already been created as a 3D model, and all the frames can be transported to and from the Silicon Graphics workstations with relative ease.

'We can bring the meshes directly over from the Silicon Graphics stations and render them in real time directly into our

Russell Shaw, Bullfrog's only sound man, taking time out. Russell had to digitise the sound from a real fairground for *Theme Park*



As with all the best games, *Magic Carpet* started life on the drawing board. This extract from the story explains how your character originally managed to get hold of the magic carpet

game,' Peter says. 'Rendering objects that are created on things like Silicon Graphics machines will also be a bit of an achievement. As Peter explains, 'The animation for all the main characters will be done using a special suit that is connected up to the Silicon Graphics station. The suit has special sensors in all the major joints so whatever movements you make in the suit are fed directly into the workstation. This will hopefully produce perfect animation.'

1,000 frames worth of perfect animation, to be precise. The team are hoping to give the main character in the final game about that many frames. A lot of time is being spent on getting the final product as realistic as possible, and according to Peter, 'The more realism you have, the more realism people will expect. Two frames of animation for something is not going to be acceptable any more. These aren't film quality graphics, but they're closer to film quality than we've had for some time – and I think it should move as well as it looks.'

As well as looking great, *Magic Carpet* is also very easy to just pick up and play. The team have made it so you can't actually physically crash the carpet. What they want is anyone to come along and pick up the mouse and start flying straight away. And **Edge** can testify that, so far at least, they've succeeded in doing this.

Peter stresses, 'You won't have to go to flight school for two years before you get started with *Magic Carpet*'.

Another factor that the team are working hard on is the continuity. In *Syndicate*, if something died, it stayed where it fell. The same applies in *Magic Carpet*. If you shoot a dragon down with a spell, it lies on the floor just where it was shot. You can fly around for hours and the dragon's skeleton will still be lying where it was shot down. Peter says, 'It's something that really, really annoys me. I really feel

Having worked on all of Bullfrog's projects, Glenn Corpes is happy with the 3D routine he's achieved in *Creation* and *Magic Carpet*

strongly about games where the bodies just disappear before your eyes.'

Adding further to the believability of the whole product, *Magic Carpet* will have a true 3D option. Donning a pair of plastic red and green glasses, Peter shows off how the 3D will work.

But these 3D glasses will not be supplied with the game. 'I would supply simple 3D glasses with the PC game, but

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prescreen

Theme Park **may 'look' like a simple game, but what you can't see is all the things going on in the background. The 'people' tables are constantly updating. Each and every person that enters your park will form their own opinion of it – if the little people think your rides are boring, simply crank up the speed of the ride. The people will love it, but the faster it goes, the sooner it breaks down. There's even an option to design your own rides**

'Beneath the simple exterior of *Theme Park* lurks a comprehensive business simulator'

I'm afraid of the health scare', Peter says. 'I can just see it now, 'That Bullfrog game blinded my sister's, boyfriend's dog.' So we'll just have to wait and see.'

A 3DO version is also in development. The 3D effect in this version will be better appreciated because of the machine's custom built 3D glasses. High-quality LCD glasses are just one of the many peripheral devices planned for the 3DO – they should be out sometime next year. *Magic Carpet* is certain to be a big 3DO hit.

Russell Shaw, Bullfrog's sound man, has been busily working on the sound effects and music that you'll hear in the final game. Russell has also been working on a 'phoneme generator' to simulate speech. He's hoping that all the characters will be able to speak without sounding stupid.

Magic Carpet will just contain speech,

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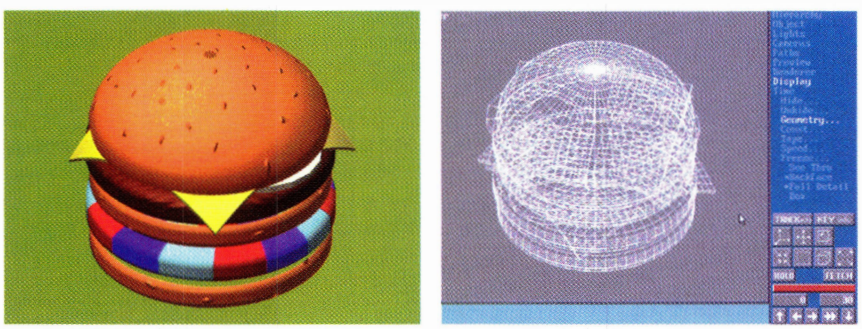


All the graphics in *Theme Park* have been constructed using *3D Studio*, surprising considering their simplistic appearance. Bullfrog are hoping to render the entire park in 3D by using these meshes

and there'll be no written text in the game at all. Russell pointed out that it's proving tough to do at the moment because he's trying to get the generator to understand French and German for those markets.

Although *Magic Carpet* is now only 60% finished, the team hope to get the product out for the first quarter of '94.

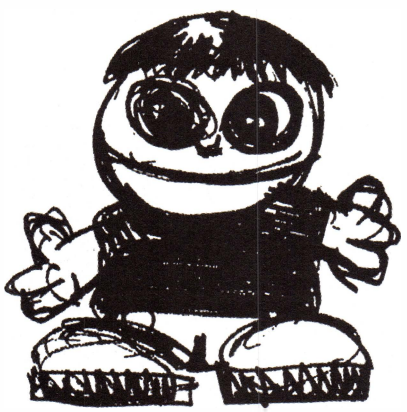
Bullfrog are

looking at an earlier release for their other game – *Theme Park*. The idea behind the game is simply this: you manage and build your own theme park to compete with 40 other theme parks in the world.

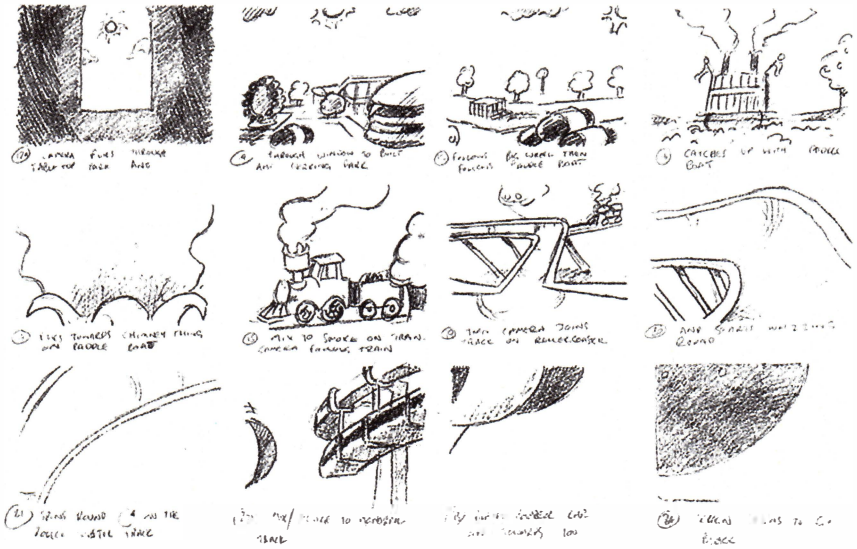
Peter outlines the inspiration behind the game, 'When I first started writing software back in '83, the first game I wrote was a business simulator. After I had made the game I was so convinced that it was going to make me my first million. I rang up the local post office and warned them that they had better get more postmen on the job to cope with all the extra mail I was going to receive. As I looked round the small office I was working in, it suddenly dawned on me that my post box in the door wasn't big enough to cope with the extra mail, so I sawed a big hole in the bottom of it.

'I took an advert out in the local paper and had calculated that Thursday was the day that all the mail would arrive. I sat down by the door at 7.30am, knowing that the mail usually came at 8.00am, and waited. I then heard some footsteps approaching the door and thought at the time that it was a bit strange that it was only one pair of footsteps, I thought maybe they've come to warn me that a huge truck was on its way to dump all my mail.

'Just then, two envelopes came fluttering through the door. Sure enough they were orders for my game, but they were the only orders I ever received. And to this day, I'm utterly, utterly convinced that one of those orders was from my mother. Everyone who played that game really liked it and so did I. I've always felt that that business game was well worth pursuing, and so I came up with the idea of *Theme Park*.'



Sketches were used to decide on how the little people would look in each country. This figure can be found in the Japanese park



If you thought that *Theme Park* doesn't need a story board, you'd be right. This story board isn't for the actual game, it's being used to outline the game's stunning introduction sequence

Beneath the simple looking exterior of *Theme Park* beats the heart of a comprehensive business simulator. Again, all the complexities have been made easily accessible to the player, so building a theme park couldn't be easier: just pick an icon and then place it on the barren field that you're given to start with. But probably the most innovative thing about *Theme Park* is the little people that come into the park.

Each and every one of them has its own individual personality. It's like an invasion of the 'Little Computer People'. According to Peter, **Donald Mitchy**, the father of artificial intelligence, and 'without doubt the leading light in artificial intelligence', came to see *Theme Park* and said that he'd never seen anything so incredible. And it's easy to see why.

Each little person has its own identity – they all have individual hunger, individual boredom, individual thirst, they get happy and they can become sad. They can even appreciate the design of your park.

Each little person takes up around 200 bytes of memory. A structure holds all the variables for each person, and these variables are constantly updated. The little people in *Populous* contained around 15 lines of information. Peter displayed the code for one person in *Theme Park*, it was at least ten times longer.

'Although the people are very complex in structure they only take up around 3% of the total game logic, because of the way we've written it. We've used time slicing and event-driven intelligences, which means that we only address the character's variables exactly when we need to. But it's the way we've processed them that's the clever part.'

Theme Park can be played in one of three ways: Sand Box mode – which is

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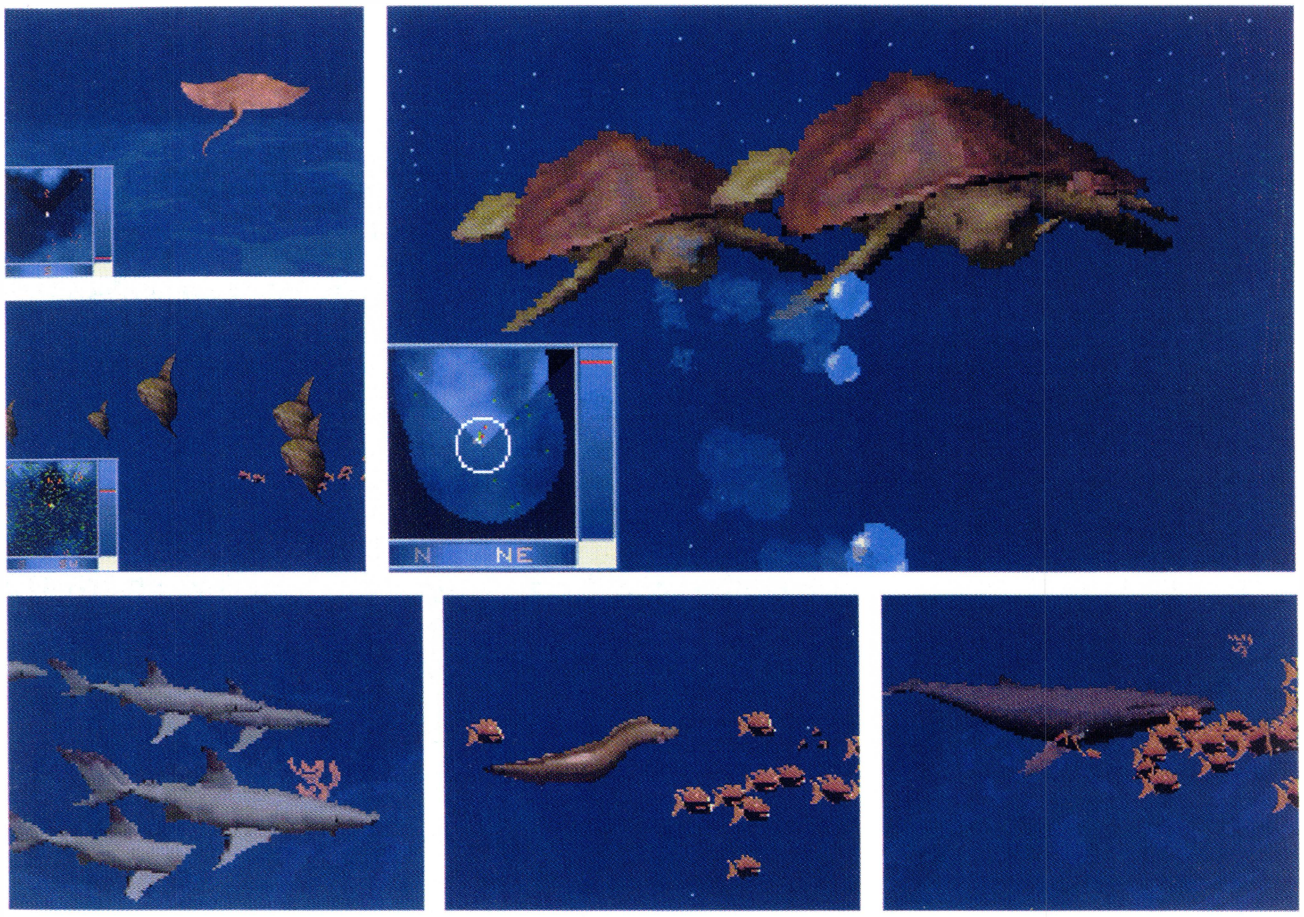
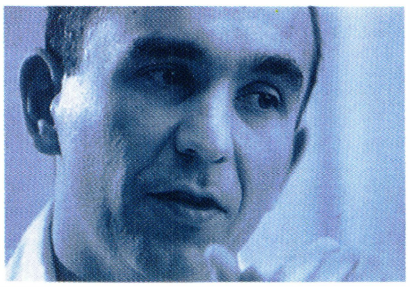
Phil Jones, one of the main programmers behind *Creation*. It took him three months to get the desired underwater effect



Creation **is Bullfrog's most ambitious effort yet. Back in '91 it started life as another 'god' game. But two years on the team have decided to take the 3D routine from *Magic Carpet* and throw the whole thing underwater. Working from library pictures, Phil Jones has concentrated on animating certain blocks to give that underwater feeling. The sun diffracting through the water is a nice touch: the further down you go, the darker the water gets**



'In *Creation*, by strapping devices to your fish, you can use them to attack the other bases'

based on just building a successful theme park with a little strategy thrown in; half Sand Box, half pure strategy; and lastly a full blown business simulator.

In the business simulator you can even alter the amount of salt that goes on the chips sold in the park. The more thirsty the people are, the more they will drink, the more they drink, the more money you make – simple but yet so clever.

Theme Park has been enjoyably researched – the team travelled around the world visiting the best theme parks – and notes were made of the rides and the atmosphere certain parks had.

The sound was sampled from real theme parks and some traditional fairground tunes will also be heard in the final version. Even the sound effects in the game are event driven. For example, the little people scream piercingly as they go round a loop on the rollercoaster.

Peter explains, 'We've tried to make everything as realistic as possible, hence the sound. You should also be able to look at the screen and know exactly what's going on. If a little kid is crying it's for a reason. If your workers are not working diligently enough, again it's for a reason — maybe they want a payrise or something.'

Another sound feature that the team hope to get into the game is a novel one – you'll be able to place a microphone on anyone in the park and listen in to their conversations. You'll be able to follow that person around and hear exactly what the people think of your park. Peter is even thinking of putting in a similar camera option, so you could look through the person's eyes with a 3D perspective.

'All the graphics – although they look simple – have been constructed out of meshes, just as they have been in *Magic Carpet*. It's all been constructed using a modeller rather than just a normal graphics painting package.

'So we've already got all these meshes, and we can then bring them in and render the whole park in real time. But to store all the meshes as well as all the graphics

Continued

would take up a lot of memory. So we may do it on the 3DO version or the PC CD version only.'

Theme Park is all set for a release early next year, and the Bullfrog team have already started coding what Peter describes as 'the most exciting topic we're working on' – and that is *Creation*.

Some of you may well recognise the name. It was an idea that started life way back in '91, and the idea then was to create different lifeforms to survive in different locations. The Bullfrog team must have shelved that idea, as this *Creation* has only been in development for a couple of months and is more than a little different.

Visually, *Creation* looks just like an underwater version of *Magic Carpet* – not surprising as it's using a very similar graphic system. **Phil Jones** heads the *Creation* development team, and he worked particularly hard on getting the whole landscape to look like it's underwater.

Phil has had to work from library pictures to get the feel and the mood of scenery just right. 'I've also been working on getting the 'shimmering' effect just right. This has been done by animating the blocks, and there's also an additional shimmering effect which is down to the way the individual blocks are Gouraud shaded. I've also put in a starfield to give the feeling of motion.'

A slightly different approach has been employed to give the surface of the ocean a 'rugged' and 'eroded' look. After the usual texture maps were added, an extra layer of bump maps was added, which basically adds indentations to the surface to fully complete the underwater effect.

The idea behind the game isn't a million miles away from the original plot. Peter says 'It's all set in the future, and it uses a similar method to *Syndicate* in the way you can control things. You're inside an underwater base with breeding tanks, and the idea is to defend your base against other attacking bases.

'You can catch fish and bring them back to base and start breeding them. You can then – by strapping certain devices to their backs – control the fish you've created to attack the other bases.'

Phil continued, 'We have around ten breeds of fish, and we're looking to get more in there. They're all rendered in 3D and take up between 80 and 120K.'

Although *Creation* is at a very early stage, it's looking very impressive. Peter and his team are even currently looking into the possibility of interlinking both *Creation* and *Magic Carpet*.

The Bullfrog team: (Top row, from the left) Mark Webley, Russell Shaw, Phil Jones, Glen Corpes, Peter Molyneux, Paul Mclaughlin, Guy Simmons. (Bottom row, from the left) James Robertson, Dennis Hassabis, Mark Lamport, and – last but not least – Fin Mcgechie

Peter explains 'If you're playing *Magic Carpet* you will be able to jump off the carpet and into the ocean, the computer will then sense whether you have *Creation* on your hard disk and plunge you straight into that, based totally on the world you were just flying around.'

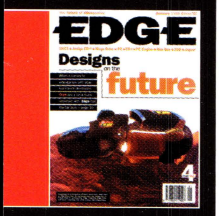
Creation, *Theme Park* and *Magic Carpet* will all be multiplayer compatible. Up to eight players can tackle missions together in *Magic Carpet*, build the most successful park in *Theme Park* or attack each other in *Creation*. Peter believes this is the way forward with games. 'Everyone is going on about CD being the real revolution, but it's going to be nothing compared with what you can do with multiplayer games. In the States, and especially in Japan, they're really pioneering the use of multiplayer games.

'They have whole towns playing games. This multiplayer idea is not going to go away, it's going to get more prevalent. I just want to make sure all our games will be compatible now.'

Whether these three games will be good enough to have 'whole towns' playing them remains to be seen, but based on what **Edge** has already seen, Bullfrog can certainly look forward to next year with some confidence.

Credits

Programmer:	Peter Molyneux
Programmer:	Glenn Corpes
Programmer:	James Robertson
Programmer:	Phil Jones
Programmer:	Dennis Hassabis
Programmer:	Mark Webley
Programmer:	Guy Simmons
Programmer:	Mark Lamport
Programmer:	Mark Huntley
Graphics:	Chris Hill
Graphics:	Fin Mcgechie
Graphics:	Paul Mclaughlin
Graphics:	Andy Sandham
Sound:	Russell Shaw



It's a surprise that we've made it to issue four without handing over a stack of pages to NEC's PC Engine, the enthusiast's import console of choice. Here, then, we make amends, and also look forward to *another* new console from Japan, this one certainly better than 3DO and easily on a par with Jaguar. Should be good...

Photography: **Peter Canning**

PC Engine

Specifications

Hu6502 CPU running at 7.16 MHz
128K Video RAM
Resolution: 320x224
Colours: 512 palette, up to 128 onscreen (workable)
Custom graphics: Scrolling, 64 hardware sprites
Sound: 6 channel PCM

Hardcore engineering

Hardcore gamesplayers adore it, and the PC Engine continues to earn respect despite being almost six years old. **Edge** reflects on the technology, the games, and even the whispers of a 32bit Engine...

The PC Engine was launched in Japan on October 30th 1987. Next to the 8bit Famicom, which by this time had established itself in one out of four Japanese homes, it looked unbeatable. This was a hugely powerful machine, with software that wouldn't have looked out of place in an arcade. But it was HudsonSoft's *R-Type* which arrived in early '88, that sold the machine in large numbers. Few gamers could resist a coin-op perfect conversion of a cutting-edge game like this. The PC Engine probably represents the most significant jump in gaming power the console market has ever seen. This was one time when gaming power in the home most definitely caught up with technology in the arcades. And yet still only in 8bit.

It was perhaps this aspect that caused the most confusion, too. Next to the 8bit computers of the day like MSX, and in this country the C64 and Spectrum, the PC Engine's performance was in a different league – firmly in the 16bit league, even surpassing the performance of the best 16bit computers of the day like the Amiga. Conflicting reports of the machine's abilities in the UK computer press now seem absurd, given the level of interest the Japanese

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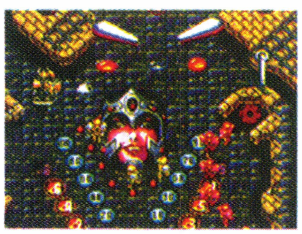
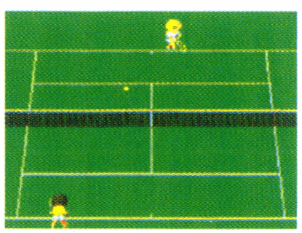
Name: **Devil Crash**
By: **Naxat (1990)**
Format: **4 Mbit HuCard**



Devil Crash is a hugely impressive pinball game for a number of reasons. The graphics are brilliant, the scrolling table works really well, and best of all it plays a really mean game. It's also more imaginative than *Pinball Dreams/Fantasies.*

Name: **World Court Tennis**
By: **Namco (1988)**
Format: **2 Mbit HuCard**



The first fourplayer tennis game for the Engine was very well received, and still plays better than almost any tennis game on any system. As a one or twoplayer game it's perhaps eclipsed by *Super Tennis* on the SNES, but it is still pretty great.

techview: PC Engine

The original white PC Engine and the newest addition to the stable, the Core Grafx II. To date, the PC Engine has sold 5.4 million systems in Japan alone...

The original CD-ROM system for the PC Engine – a stylish briefcase and CD player – was launched way back in 1988

Continued

market now sustains over here. But this was a time when the import market was in its infancy. In many ways the PC Engine set the ball rolling for the wealth of choice the consumer now enjoys.

Throughout the lifetime of the Engine NEC has consistently catered for the enthusiast. While Nintendo like to release one standard and sell it millions over, NEC take a more splintered approach – a wealth of upgrades and accessories for its games machines have always been the company's trademark. Who else would produce a cushion that vibrates to the sound of your games? And *nine* different versions of the PC Engine? What about CD-ROM? For years NEC were the pioneers of this medium in the console industry, having had a few years headstart on Sega and Fujitsu with its CD-ROM² add-on system for the standard Engine.

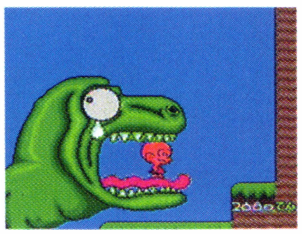
The PC Engine CD-ROM² system was a neat piece of kit – a stylish grey briefcase that positioned a small white NEC CD drive next to an Engine. Unfortunately the first operating system was hugely flawed, relying on the tiny 64K of buffer RAM in the briefcase interface. An upgraded operating system card included a supplementary 1.5 megabits – the Super System 3.0 card was released in 1991 roughly at the same time as the Super CD clip-on system and the all-in-one Duo. Immediately CD-ROM releases flourished as programmers found they could do so much more with the system. With this, the PC Engine CD-ROM system has become the most successful CD-ROM games system yet produced.

In order to further satisfy the fickle diet of the Japanese gamesplayer, NEC produced a laptop version of the PC Engine in 1990. Including a superb high quality LCD screen – one of the less impressive aspects of the GT – the PC Engine LT was the ultimate gadget for the gamer on the move, although it's possible to slot it into the old CD-ROM briefcase to play CD games, too. It was horrendously expensive when first released (approximately £500!), the LT can now be picked up for around ¥47,000 (£300). Which

Name: **Parodius**
By: **Konami (1991)**
Format: **8 Mbit HuCard**

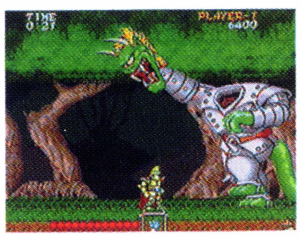
The scrolling shoot 'em up that was a success on the SNES appeared first on the PC Engine, and in many ways it makes more impressive use of the hardware. There's no slow down, the parallax scrolling is great and the use of colour is excellent.

Name: **PC Kid**
By: **HudsonSoft (1989)**
Format: **3 Mbit HuCard**



Sega has *Sonic*. Nintendo has *Mario*. And NEC has *PC Kid* (or Bonk as he's known in the US). But don't be fooled by the cacky graphic – it's the gameplay that counts and that's fabulous. It's also worth checking out *PC Kid 2* and *3*.

Name: **Ghouls 'n' Ghosts**
By: **NEC Avenue (1991)**
Format: **8 Mbit SG HuCard**



The best conversion of the coin-op you'll find. And still the best Super Grafx game out of the six available. What separates this from the Mega Drive version is the sprite colour and parallax backgrounds; gameplay is just as unforgiving as the coin-op.

Name: **Gradius II**
By: **Konami (1992)**
Format: **Super CD-ROM²**

Impressive use of the Super CD can be seen in *Gradius II*. Konami's fantastic conversion of the *Vulcan Venture* coin-op has been very difficult to get hold of since it was released in December last year, but fans of the series shouldn't miss it.

The American PC Engine, the Turbo Grafx, wasn't the same success story, though two million units and 100,000 CD systems have been sold

To replace the old briefcase CD-ROM system, NEC introduced the PC Engine Duo in 1991. A newer white model, the Duo R, is now available

still makes it (gulp) ten times more expensive than a Game Boy.

Ever heard of the PC Engine Shuttle? Well few people did ever get to hear about it. This spaceship-shaped version of the PC Engine released at the same time as the Core Grafx, and was targeted directly at the younger player. While this idea might have worked in theory, in practice it was unsuccessful. By selling it at only marginally less than the price of a standard Core Grafx, and at more than the price of the white PC Engine that many shops still stocked, there wasn't much point to the Shuttle. And besides, it couldn't be hooked up to the CD-ROM system, which the future of the Engine was based around. The Shuttle was a mistake but it wasn't on its own in that respect, as you're about to see.

NEC's most extravagant hour was undoubtedly the introduction of the PC Engine Super Grafx console in December 1989. This was their attempt at quashing the growing enthusiasm for the Mega Drive which had been released in Japan. Aimed at more dedicated players than the standard engine, the Super Grafx was designed as a faster machine, a sort of go-faster, turbo-nutter PC Engine for hardcore gamefreaks.

Technically it's a strange beast. In order to maintain compatibility with the standard Engine, the CPU inside the Super Grafx was kept the same. In fact, most of the Super Grafx is the same as a standard PC Engine. The main difference lies with the inclusion of a second video display chip (VDC) – the custom graphics chip responsible for the Engine's hardware scrolling and sprite handling. A second chip doubled the number of available sprites to 128, reducing potential flicker, and also added an extra playfield, or background, for parallax scrolling. Other differences were mainly in the amount of RAM in the machine. Video RAM was doubled, naturally, while the pitiful 8K of main RAM in the original Engine was increased fourfold for the Super Grafx.

Unfortunately, though, the Super Grafx turned out to be a

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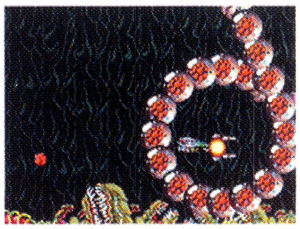
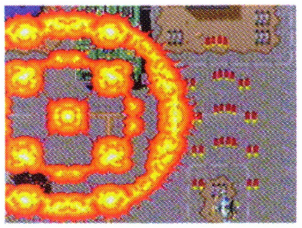
Name: **R-Type I-II**
By: **HudsonSoft (1988)**
Format: **2 X 2 Mbit HuCard**



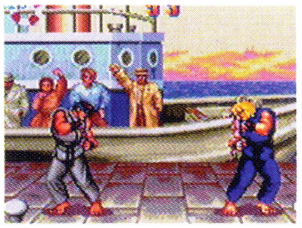
The graphics are superb in *R-Type* – the detail and use of colour has hardly been bettered. But the gameplay is in a class of its own. Despite the fact that the cartridge version comes on two HuCards, this is still the Engine's finest hour.

Name: **Ultimate Tiger**
By: **Taito (1989)**
Format: **2 Mbit HuCard**



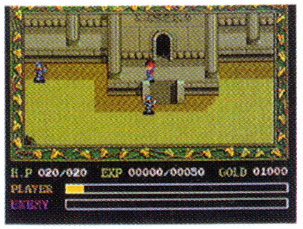
The coin-op was overlooked in the arcades but Taito managed to cram it perfectly into 256K. With great music and the best 'copter sound ever, *Ultimate Tiger*'s an intense shoot 'em up worthy of a place in any Engine owner's collection.

Name: **Street Fighter II CE**
By: **NEC (1993)**
Format: **20 Mbit HuCard**



People who reckon that the Engine is no match to the Mega Drive should take a look at this. The graphics are more colourful than the Mega Drive game and the samples are clearer. It's a shame that Turbo mode wasn't included, though.

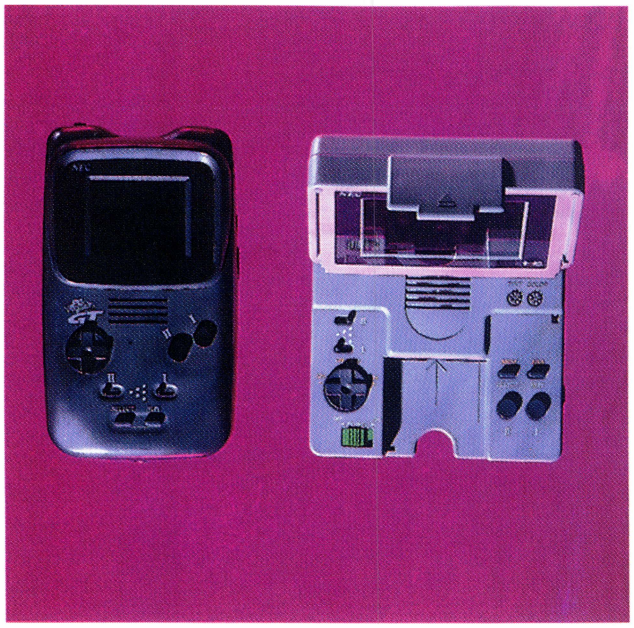
Name: **Ys Books 1 & 2**
By: **HudsonSoft**
Format: **CD-ROM²**



Many aspects of this action RPG series are crude and some of the graphics looked ropey when it was released. But for many this is a cult RPG making great use of the CD for speech, animation and probably the best music ever heard on the system.

techview: PC Engine

The American Turbo Duo – by far the most popular machine on import – also runs Japanese PC Engine CDs. Japanese HuCards need an adaptor



First came the GT (left) and jaws dropped at the price. The brilliant laptop Engine, the PC Engine LT, was in another league, though...

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spectacular flop. Why did such an exciting machine fail to take off? Well, first of all it wasn't. Exciting, that is. From a marketing viewpoint the plasticky, ugly outer casing wasn't a good choice. NEC had tried to go for a mechanical, techy look while increasing the size of the machine to fit in with the trend (at the time) for bigger home gadgets in Japan. Many Japanese players thought it looked gimmicky – hardly fitting in with the ethos of the PC Engine – a compact, understated, but powerful games machine. It made the mistake of trying to look more powerful than it actually was.

Because of the decision to keep the machine compatible with the original Engine, developers found it cumbersome to program. While the machine was capable of displaying twice as many sprites, as well as running two playfields instead of one, the increased workload on the CPU meant the old 8bit processor wasn't really up to the job. And even worse, the Super Grafx's sound capabilities weren't improved over the original Engine sound – hardly the PC Engine's original strong point. An initial manufacturing run of 50,000 units was supported by the release of a single game – *Battle Ace* – a crude 3D shoot 'em up in the style of *After Burner*. A superb conversion of *Ghouls 'n' Ghosts* followed three months later, but by this time the fate of the machine looked certain – Super Grafx R.I.P.

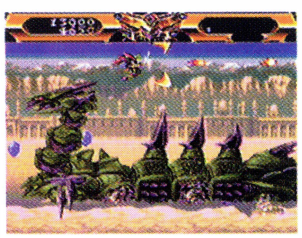
In America NEC had a harder time convincing the public that this was a great games machine. After struggling along solo for a while, a joint venture with HudsonSoft established Turbo Technologies, who improved the status of the machine and its software in the US market. However, the badly Americanised versions of Japanese games still didn't impress, and the restyled Turbo Grafx made few friends.

With the release of the Turbo Duo, things improved stateside with quality Super CD-ROM software still putting most Sega CD games to shame, but realistically it seems unlikely that TTI will ever be able to gain a substantial share of the US videogames market.

Name: **Gate Of Thunder**
By: **HudsonSoft**
Format: **Super CD-ROM²**

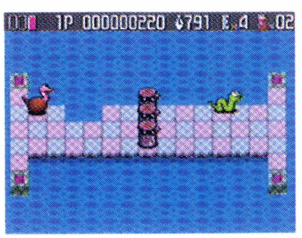
One of the first games to exploit the greater memory of the Super CD-ROM² system, *Gate Of Thunder* excels in both speed and intensity. The graphics aren't the most detailed or colourful around, but the gameplay is great.

Name: **Lords Of Thunder**
Publisher: **HudsonSoft**
Format: **Super CD-ROM²**



After the spaceship theme of the first game, the old world feel of *LOT* is a nice change and the graphics are outstanding – using the scrolling and sprite handling abilities of the Engine to the limit. The music isn't quite up to the first game, though.

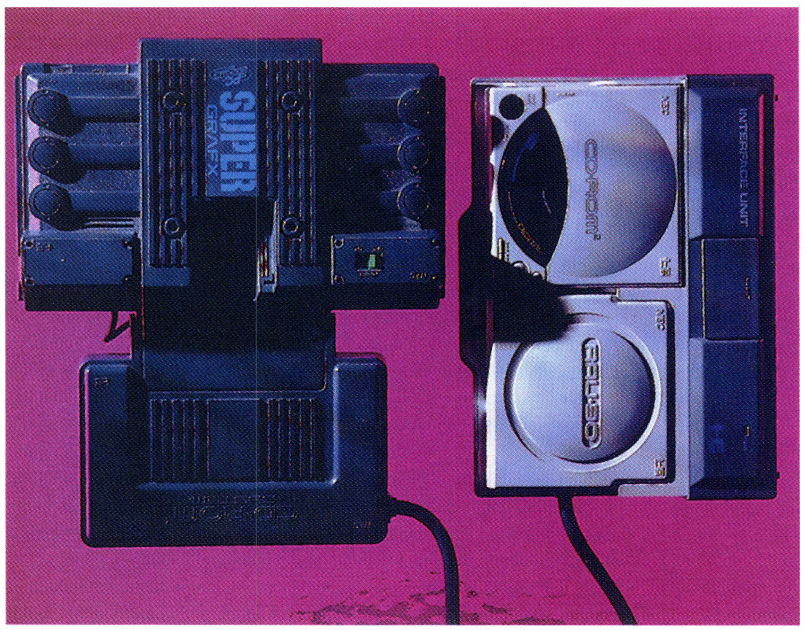
Name: **Splash Lake**
By: **NEC Avenue (1991)**
Format: **Super CD-ROM²**



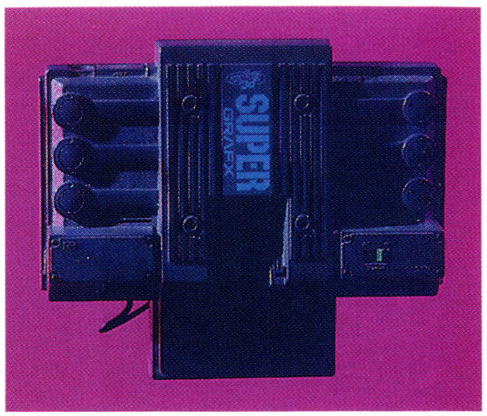
An extremely silly, but popular, puzzle game with simple gameplay involving a pecking duck and lots of tiles. It's fun, but perhaps the best aspect of the whole thing is the hilarious music – some of it sounds like Steptoe and Son.

Name: **Bloody Wolf**
By: **DataEast (1989)**
Format: **4 Mbit HuCard**

This *Commando* clone looks a bit dated, but still has more than its fair share of gameplay. It's sufficiently violent, it uses an unusual perspective, and above all is very fun to play. Just don't compare its looks to the state of the art now.



The Super Grafx was a space-hungry beast on it's own (top right), but when connected to the CD-ROM through a huge adaptor, it started to take over the home



The only five dedicated Super Grafx games – *1941*, *Aldynes*, *Battle Ace*, *Grand Sword* and *Ghouls 'n Ghosts*

The arrival

of the next generation PC Engine has been rumoured for the last couple of years. While 3DO and Atari seem confident to usher in a new dawn of technology, NEC has remained cautious, like its main rivals Nintendo and Sega, preferring to see out its 8 and 16bit hardware to the very end, and waiting until it can price new hardware competitively.

NEC's 32bit technology known as the Tetsujin (which translates as Iron Man) was announced back in the summer of 1992 and NEC had originally planned to release this super console around the Christmas period of 1992, but incomplete software persuaded them to delay it until the following spring. Unfortunately, though, Spring 1993 just wasn't to be either. So, 1½ years after the completion of the hardware it seems NEC are finally confident of a release date for their machine – Spring 1994.

A developers' preview of the prototype hardware was held way back in December '92 when selected companies from the UK and Europe were invited to HudsonSoft's headquarters in Sapporo to assess the hardware. And here's what was shown:

A CD-ROM-based machine containing a five-chip custom graphics set developed by HudsonSoft, supporting full-screen JPEG assisted 24bit colour FMV at 30 fps. The machine also used a RISC-based CPU running at just under 25 MHz and was supported by lots of RAM – at least two megabytes as an immediate cache for the CD. Most impressively, though, the hardware also allows for around seven or eight hardware playfields, meaning multiple parallax images and complex 3D backgrounds. Remember, the original PC Engine only contained a single playfield.

At the same preview HudsonSoft ran a PC Engine emulator on their new machine that was powered by the RISC processor, and they managed to get their original Engine version of *R-Type* running in a single playfield.

And demos of JPEG-assisted 24bit full-motion video were

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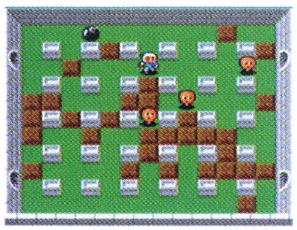
Name: **Bomberman**
By: **HudsonSoft (1990)**
Format: **4 Mbit HuCard**

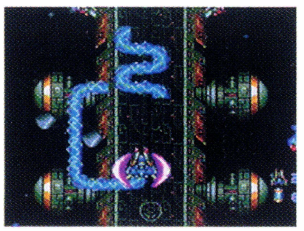


Way before any other machine, the PC Engine played host to the excellent *Bomberman*. In oneplayer mode things get a bit tedious, but with up to five players the action takes some beating. Probably the best multiplayer game ever created.

Name: **Super Darius**
By: **Nec Avenue (1990)**
Format: **CD-ROM²**

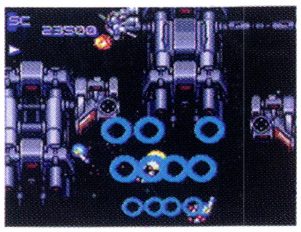
The first of many CD-ROM shoot 'em ups to impress on the Engine, *Super Darius* is an incredibly tough blaster, that duplicates the three-screen coin-op surprisingly well. Great Surround Sound music and some fantastic boss creatures.

Name: **Gunhed**
By: **HudsonSoft (1989)**
Format: **3 Mbit**



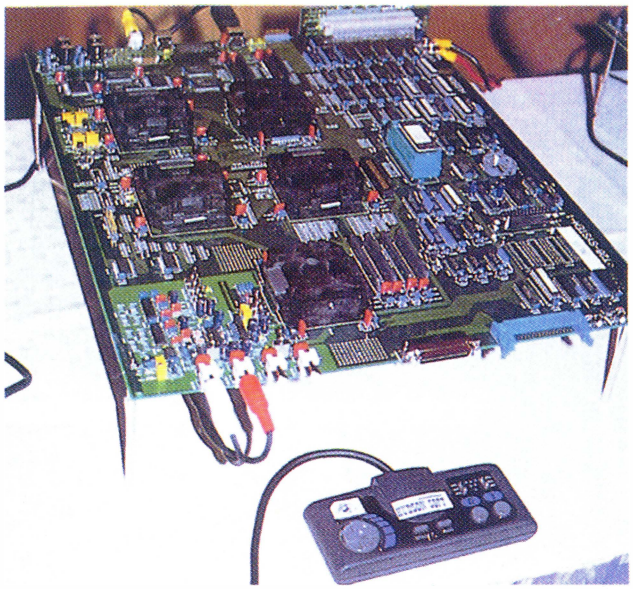
A highly-rated game at the time, *Gunhed* impressed with its fast vertical scrolling and great weapons. It still plays well, but for the most part it's difficult to see why it was so highly regarded. Extremely impressive sprite handling, though.

Name: **Super Star Soldier**
By: **HudsonSoft (1991)**
Format: **4 Mbit HuCard**

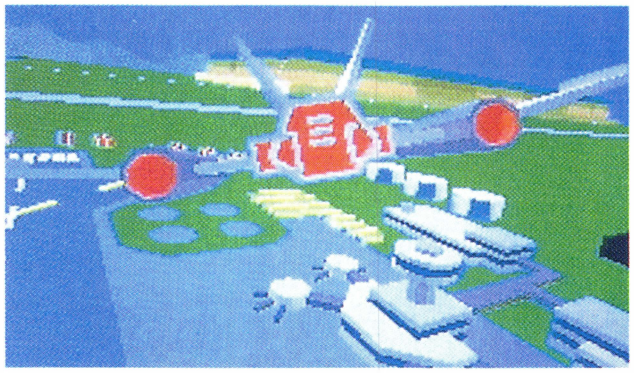


The second in the *Gunhed* series has more impressive graphics, a darker more menacing feel to it, and is a bit tougher than its prequel. The power ups aren't quite as over the top as those found in *Gunhed*, but the gameplay's just as slick.

techview: PC Engine



The provisional Tetsujin hardware includes a 25 Mhz RISC processor, and a custom chipset developed by hardware gurus Hudson



A tentatively titled *Super Star Soldier 3D* was one of the early demos aimed at whetting the appetites of developers for the Tetsujin...

Continued

displayed – the 16 million colour images ran at 30 frames per second and the quality was supposedly excellent – far better than the rough CinePak demos the 3DO Multiplayer currently offers. The only noticeable trade-off appeared to be a limit of 32 minutes of video per CD disc.

HudsonSoft and NEC Avenue were the only software companies to demonstrate any new games – three were shown. A 3D polygon shoot 'em up, provisionally titled *Super Star Soldier 3D*, a far cry from the vertical scroller on the PC Engine. Like Namco's astonishing *Galaxian*^{3}, Hudson's game used a full-motion polygon backdrop (an advanced version of what is shown above) with detailed real time 3D sprites on top. The result? A game that looked remarkably similar to Namco's *Solvalou*. On a more interactive level, an attractive *Dungeon Master*-style 3D role playing game was shown, with visuals surpassing even those of *Forgotten Castle* on the PC. The only other thing of interest was a very early demo of a robot fighting game which looked good if only for its use of rotoscoped animation.

So NEC and Hudson Soft seem to be onto another winner. One developer **Edge** spoke to, had this to say: 'Hudson's original PC Engine was so cleverly designed that we obviously have high hopes for the new one. What separates Hudson is that they really think about the kind of games they want to see when designing hardware – unlike the guys who did 3DO. That's a typical US mess: strange, and restrictive in so many ways. Hudson's kit will be a whole lot better.'

But with so many new consoles emerging all the time, how will the Tetsujin fare against the competition? 'In terms of raw specs it's easily on par with the Jaguar, and definitely better than 3DO,' he adds. 'How it compares to the Saturn and the new Nintendo hardware is another matter altogether.'

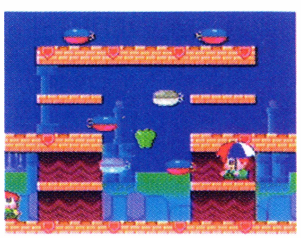
Keep up to date with **Edge** for more news on the Tetsujin project.

Buying a PC Engine

The most popular machine currently available on import is the US version of the PC Engine Duo, the Turbo Duo, but Japanese machines are still available. The most important thing to remember when buying a PC Engine is that Scart versions need a colour booster to compensate for the poor RGB quality. Without this, colours are usually very dark.
Contacts: Console Concepts – 0782 712759
Raven Games – 081 663 6810

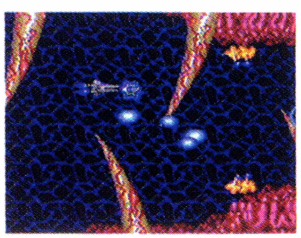
For an excellent comprehensive guide to the PC Engine send a cheque or postal order for £3 to Richard Gibbs, 3 Garden Place, Bootle, Liverpool, L20 3LW

Name: **Parasol Stars**
By: **Taito (1991)**
Format: **3 Mbit**



This is closer to *Bubble Bobble* than *Rainbow Islands*, so fans of the first game will probably love it. *Parasol Stars* is a colourful and enjoyable twoplayer platform game with Bub and Bob armed with parasols to kill screen after screen of baddies.

Name: **Salamander**
By: **Konami (1991)**
Format: **2 Mbit HuCard**



Fancy the entire *Salamander* coin-op on one tiny 256K card? The graphics look bland at first, but the speed and playability of the game impress from the start. The PC Engine has the best *Nemesis* conversions around.

Name: **Air Zonk**
By: **HudsonSoft (1992)**
Format: **8 Mbit HuCard**

PC Kid in a shoot 'em up might not sound like a good combination, but this is as skillfully crafted as most HudsonSoft releases. Colourful graphics, amazing sprite handling... You'll find the best qualities of the top Engine shoot 'em ups in here.

Name: **Dracula X**
By: **Konami (1993)**
Format: **Super CD-ROM^2**

A huge, challenging game with multiple routes, secret rooms, a choice of characters and that classic *Castlevania* playability. Graphically, not quite as good as it could have been, but who cares when there's so much to get your teeth into. (Sorry.)

It only plays like it's still there. The new Xbox 360™ Wireless Controller. Unmatched precision and performance to instantly reflect your every move. And with an advanced ecosystem of wireless products, you'll have the freedom to get the most out of Xbox 360, because they come from Xbox.

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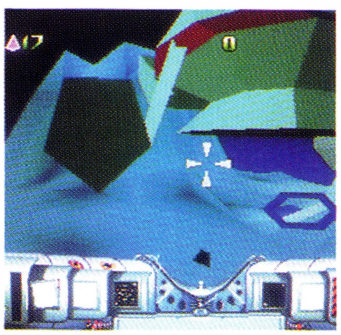
Cybermorph

The first Jaguar game review in **Edge**. If the screenshots look a little unusual it's because they're from photographs, not digital captures. As for the game itself, expect to see its Gouraud shading make an impact. What about a format that saves hi-scores and control settings but relies on passwords for missions, though?

Format:	Jaguar
Publisher:	Atari
Developer:	Attention To Detail
Price:	£NA
Size:	16 Mbit
Release:	December

With 64bit architecture and a host of custom chips, the Jaguar excels at 3D. Indeed, *Cybermorph* – which is bundled with the machine – is a glorious looking game with Gouraud shading and loads of colours



With *Cybermorph*, you can view the action from the cockpit (top) or from behind your ship, *Starwing*-style (bottom). You also get a radar in the top righthand corner of the screen and a ground height/altimeter in the bottom righthand corner

Atari need a winner. With the Falcon dead, the Lynx an endangered species and the ST coughing up blood after a severe bruising from the Amiga, Atari's hopes of success – and even survival – are pinned on the matt black casing of the Jaguar.

And, likewise, the Jaguar needs a winner. The Super NES has *Super Mario*, *Starwing* and *Street Fighter II*. The Mega Drive has *Sonic*, *John Madden* and *Street Fighter II*.

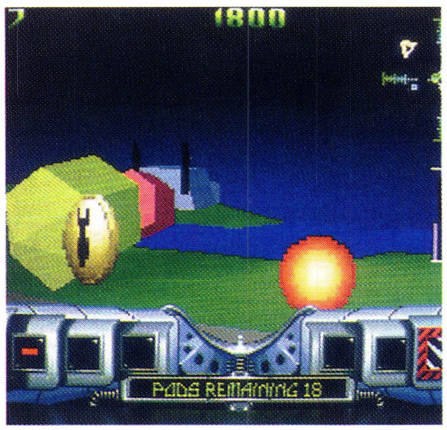
Like 3DO, the Jaguar needs to make an impact. Thankfully, it has *Cybermorph* on its side, which comes bundled with the machine.

Cybermorph – coded in the UK by Attention To Detail – is as good a showpiece for the Jaguar as Atari could have hoped for.

Set on a distant planet... well, 52 distant planets to be exact, *Cybermorph* is a cross between *Starwing*, *Virus* and a 3D *Defender*. At its most basic, the game is a collect and shoot 'em up: kill the baddies, get the power-ups and collect all the pods so you can exit to the next planet. Simple.

Of course, there's much more to it than that. Each planet has its own brand of devious enemies who shoot at you, ram you, stick to your craft and generally get in the way.

Pods are hidden, imprisoned, caged up or



This transport ship shuttles back and forth carrying power-ups (the purple and yellow discs). Blast it, and they fall to the floor...

guarded by forcefields. And large sections of the planet are blocked by walls or hidden pathways through ravines and valleys.

Simple, yes. Easy, no.

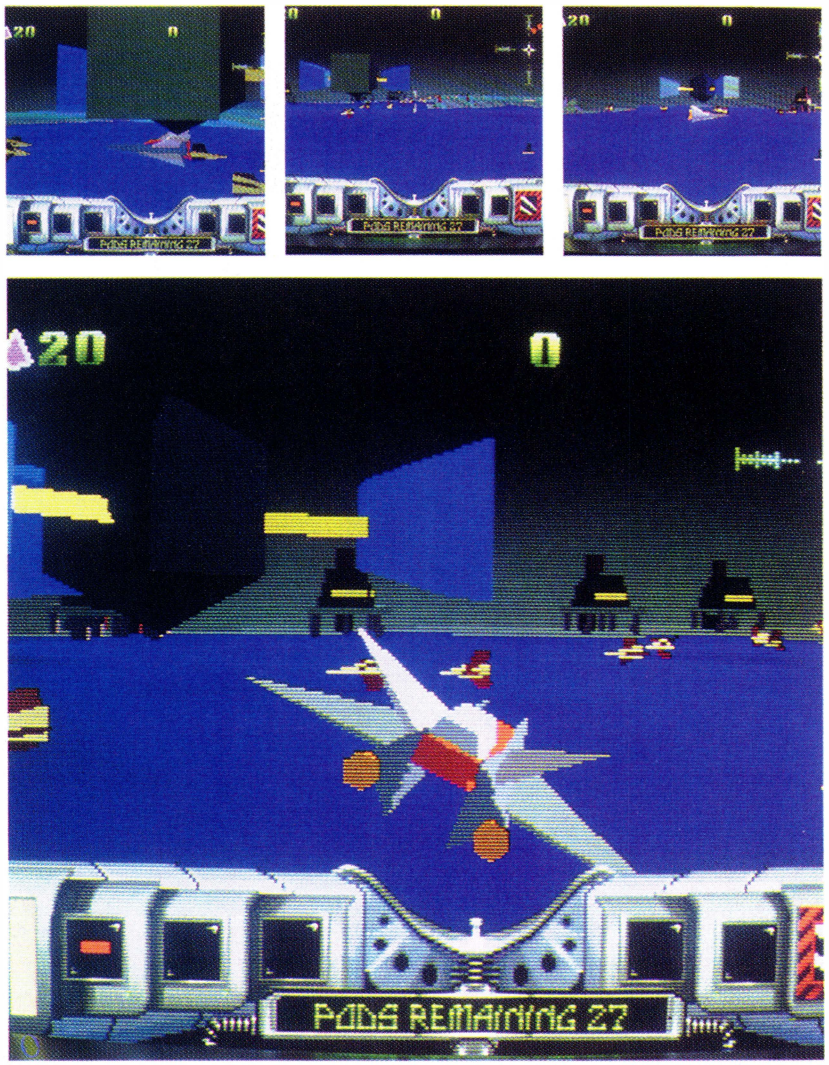
Okay, you get six weapon systems to collect and three different superweapons with which to lay waste your enemies.

But you also get a paltry three lives which, on your first attempt, should last about a minute. As you find your way around the multi-button joypad (which isn't quite as dismal as **Edge** first feared) and gradually learn to control your ship, the game opens up to reveal hidden depths.

You also have a guide through this bewildering world in the shape of Skylar, your onboard holograph. This bald female pops up to proffer the odd word of advice, encouragement and to tell you when you have only one pod left to pick up.

The speech is 16bit sample perfect – real F-15 cockpit stuff – and is a welcome sound amongst the laserfire and explosions. Skylar has a repertoire of 11 phrases from 'Ouch' when you take a hit, to 'Portal now open' when the last pod is in your possession.

Spinning triangles are teleporters which warp you to different locations. The screen performs a swift blue-out, and you reappear elsewhere



You can view the action from a number of standpoints: from behind your ship (main), from the left (top left), inside the cockpit (top centre), or from the right (top right). You can also view the ship from in front which, like the side views, is a nice touch but pretty much useless...

In fact it's a lot of these subtle – almost useless – touches, that elevate *Cybermorph* from just another 3D game. You can view your ship from four different angles, not including a cockpit view; you can alter the volume of sound effects, engine whine and Skylar's speech while the game is paused; you can toggle the targeting crosshair on and off; and you can reconfigure the controls to suit your own preferences. Even the cartridge is user-friendly, saving your control settings and high scores, thanks to an E^2PROM (Electrically Programmable Read-Only Memory) chip inside.

And speaking, as we were, of controls, the T-Griffon ship is surprisingly responsive – almost over-responsive at first, until you get to grips with its turning circle and the way in which the entire 3D landscape moves around the ship. One excellent feature is that you can stop the ship dead, and even go into reverse, sliding backwards over the landscape (a

Continued next page

testscreen

Here are two of the pods that you are tasked with collecting. Some, like these, are found just lying around the place while others are secreted in prisons or behind huge, apparently impregnable forcefields

This missile-gobbing head appears as the first end-of-system boss. However he pops again as a standard enemy on planet Hades (above). Having dispatched his arsenal, he slides back below ground, out of sight

Vortex towers (top) sit like tall, polygonal plants, infecting the landscape with antimatter. Worse, Pod Snatchers (bottom) pick up your pods up and drop them onto the blackened land where they slowly die – unless you come to their rescue

← particularly useful tactic since you can still fire forwards at any oncoming vehicles).

So the T-Griffon is more like a helicopter than a plane – and a good thing too. It would be far less playable if, on missing a pod, you had to fly around for another pass.

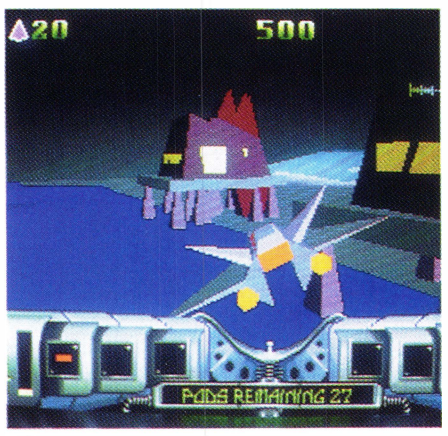
Given that *Cybermorph* is a) tricky and b) huge, it's only sensible that ATD have included a password system, enabling you to save your game after every eight planets. And there's a code to a secret system with... well, that would be telling.

Extra lives are awarded on gaining high scores, and with pick-ups. There are also a number of secret worlds to be discovered, strewn with free power-ups.

Without doubt, *Cybermorph*'s main lure is the visuals: it sure is a looker, with millions of colours and stunning Gouraud shaded landscape. It all moves dead smoothly but, to be honest, the 3D ships and buildings are all a bit basic, made of simple shapes with gaudy colour schemes. There's little of the finesse that you find with simulators like *TFX*, and even *Starwing* contains much more interesting enemies.

But in the final assessment, it's gameplay that counts and *Cybermorph* has nothing to fear in that department. From the first firebutton press, it's pretty much non-stop action, and even though there's no timer, the game comes with a built-in sense of panic as you attempt to scoop up all the pods and haul ass outta there.

Each planet differs enough from the last to avoid unwanted sensations of déja vu, and there are enough new enemies and puzzle



Your ship – the T-Griffon, or Transmogriffon – changes shape depending upon its speed, becoming sleeker at high velocity

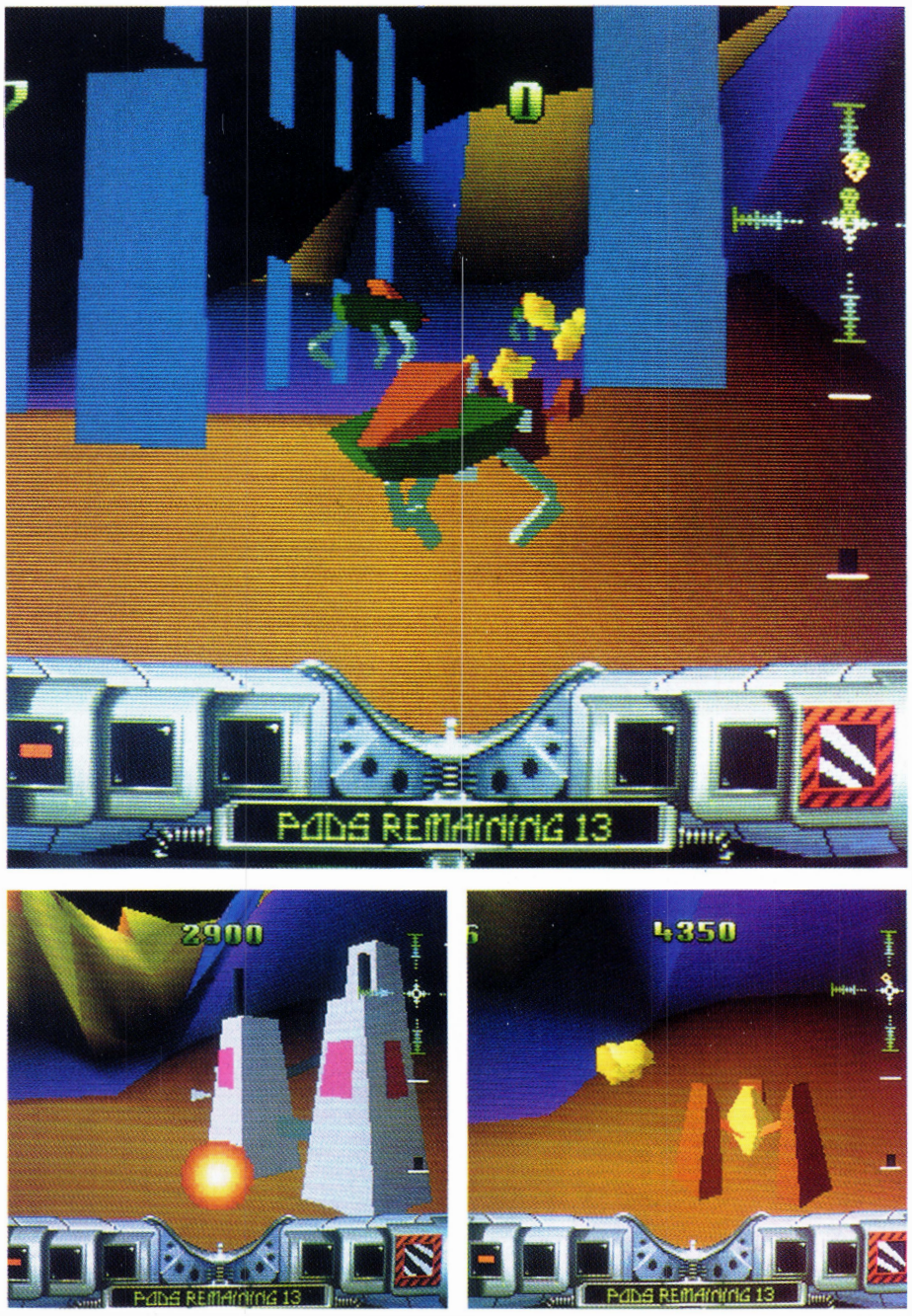
elements introduced so that you just never quite know what's coming next...

It's also a perfect first-time game for new Jaguar owners: it's easy to pick up and play, you can roam around blasting things to bits without necessarily knowing what your mission is, and you have a choice of planets to play before you start going over old ground.

But, best of all, Jaguar owners can feel that their purchase was justified. *Cybermorph* is a fine game in its own right, and carries with it the promise of Jaguar games to come – not least of which is the sequel *Battlemorph* from ATD, due late '94.

Like *Crash 'n Burn* which is bundled with Panasonic's 3DO, *Cybermorph* isn't perfect, but it's a damn good start. And that's exactly what the Jaguar needs.

Edge rating: **Eight/** 10



Later planets provide puzzles to solve. The huge, blue forcefield (main) – which looks more impressive in the game itself – separates you from your pods. Fly through the right transporter and you find the generator (bottom left) that powers the forcefield. Destroy it, warp back and it's pod city (bottom right)

Attention To Detail

ATD

ATTENTION TO DETAIL

Cybermorph was written by Attention To Detail – a small outfit now based in a converted farm building near Warwick.

But while the name may not ring many bells, ATD have been involved in some major projects, including a development system and *The Last Ninja* for Konix' doomed Multisystem, plus a couple of projects for Lucasfilm games – *Night Shift* and *Indiana Jones And The Fate Of Atlantis.*

They have also been involved with some coin-op quiz machines and have a new coin-op system under wraps. They are currently undertaking *Battlemorph* for the Jaguar and have a conversion of the Lynx game *Blue Lightning* for the end of next year.

Cybermorph was programmed by Fred Gill and Brian Pollock, with design by Chris Gibbs, Fred and Brian. Graphics were the responsibility of Chris and Ian Harling, with sound by Uncle Art and Andrew Holton. It was produced by John Skruch at Atari's Sunnyvale HQ in California.

EDGE magazine January 1994

Secret Of Mana

An action-RPG that's better than *Ys I & II*, *Zelda III* and – dare we even say its name? – *Landstalker* on Sega's Mega Drive? That's what Square Soft appears to have cooked up here, with support for three simultaneous players, 58 types of armour, 27 different spells, and, crucially, packaging that's just like the Japanese original's.

Format:	SNES
Publisher:	Square Soft
Developer:	In-house
Price:	£60 (import)
Size:	16 Mbit + BB
Release:	Out now (US)

On the face of things, the *Secret Of Mana* probably won't do as well as it deserves to, which is a shame as it's such a well-crafted piece of software. It's better than *Ys I & II* on the PC Engine. Better than *Zelda* on the SNES. And yes, better than *Landstalker* on the Mega Drive.

But it arrives in the States completely un-hyped and mostly unheard of. Ironic, when the Super Famicom version, *Seiken Densetsu 2*, was far and away the most widely covered game of the year in Japan, generating huge levels of interest, and selling to avid gameplayers by the truckload.

At a cursory glance *Secret Of Mana* looks like an average Japanese RPG with a pre-set storyline, and translated text. That is, your time's either spent wandering around the place killing things, or talking to small cute characters. But within this well-worn framework *Mana* includes some of the best game design and features ever seen: simultaneous threeplayer action, the best combat system ever designed, the best player interface ever designed, a superb control system, and yes, some of the most engrossing and rewarding gameplay yet. It really is in a class of its own as far as action RPGs or adventures go.

And that's the point to stress here. It's essentially an adventure – all the traditional RPG elements are included – but it's fast, and combat plays a far greater role. Something that's far more skillfully handled and enjoyable than it was in *Zelda*, for example. There are

One of the first tough boss opponents is this plant-like bird creature

Supplied by **Console Concepts (0782 712759)**

The game begins in earnest when the sprite and girl characters have been found and recruited on the quest – in oneplayer mode, two of the characters follow you around the screen, even attacking enemies when confronted. With the Super Multitap, threeplayer games are superb. (inset) First steps for the hero

The game world is so huge in *Secret Of Mana* that airborne travel is one of the fastest ways to get around. Pay a small, squat chap about 50 gold coins and you'll get fired from a cannon to a destination of your choice. Mode 7 scrolling like this is used much later in the game when you can ride a dragon

64 different types of weapons, 58 types of armour, 27 different spells and all this detail is handled by a superbly designed player interface. Selection rings rotate around the player and don't obscure the action onscreen, while the ability to select something and then give it to one of your companions is simplicity itself.

And as if all that wasn't enough, *Secret Of Mana* looks great too. For a start it's great to see that the Americans have kept the brilliant Japanese artwork in the packaging – usually the first thing to go. And the game graphics are unique and appealing, reflecting the artist's surreal vision of the game perfectly. Some of the nicer graphic effects are saved until much later in the game, though. What can't be conveyed here is the beautiful sounds in *Secret Of Mana*. The wide range of folky, ethereal soundtracks really create a wonderful atmosphere, even if a few of the tunes get a little irritating at times.

Of course, the sheer size of *Secret Of Mana* is staggering. It's estimated that the average player will take around 70 hours to complete it. And for that reason alone it's a serious gameplaying proposition, offering great value.

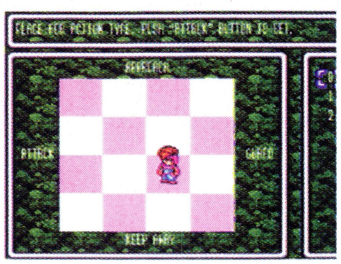
The fact that it's also an immensely entertaining game, makes it an unmissable experience.

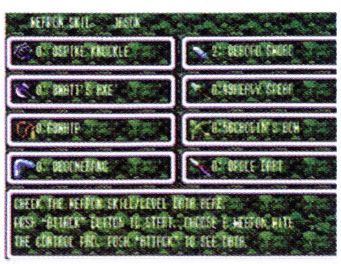
Edge rating: **Nine/10**

The Power of Mana

Okay, here's the plot in a nutshell. The Mana tree – the stunning creation you'll see on the game box and poster – is the source of all peace and harmony in the land. However it's under threat from demons and it's your job to track down eight seeds which have been scattered through the land in order to protect its people.

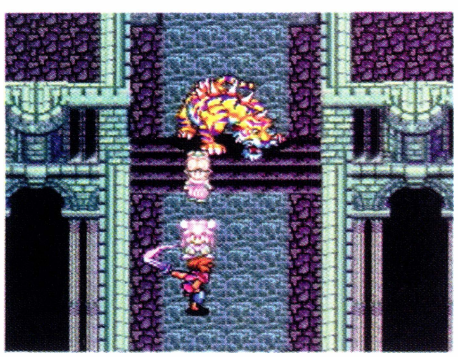
Once a palace is sealed off you'll receive an energy orb which improves the power of your weapons. Of course, it's hardly that simple. Along the way the quest is divided up into dozens of sub-quests which will take ages to get through. Expect a few sleepless nights with this one...





(From the top) Using the whip, our heroes can cross gaps; the player interfaces consist of scrolling rings; it's possible to set attack patterns; each weapon can be powered up too

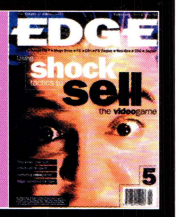
In the Witch's castle the characters prepare to meet the boss, which lies beyond this room...



Spiky Tiger is a tough opponent – here, the girl and sprite have died, hence their ghostly shapes

Cutting edge

The very latest **news** from across the entire world of videogaming



Yes, that is the fat bloke from the Sega ads on the cover. Here, though, it's all about early word on Sega's Saturn, truly a forward-looking machine, with Model 2-quality graphics, HDTV support, the possibility of running games direct from a network, and the prospect of PS-X ports from Sony itself...

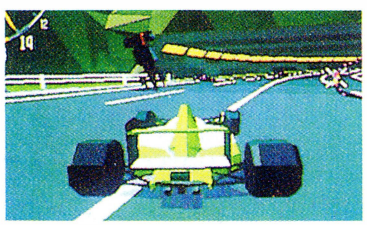
Project Saturn: worlds apart?

From rumour to legend in one small step: with the release of new tech-specs, Sega's 32bit Saturn system is already the stuff of dreams...

An artist's impression of Sega's 32bit console, codenamed Saturn

Illustration: Paul Kidby

Sega's next generation 32bit console – codenamed Saturn – grows in stature with the latest tech specs, plus the knowledge that a select few software houses in the US and Japan have actually taken delivery of emulation hardware. An insider at Sega Japan told **Edge** that Saturn's processors are currently only 40% complete.



Sega's *Virtua Racing* coin-op in all its glory. Saturn, by all accounts, is more powerful. The mind boggles...

Prototype units or finished development kits aren't expected to be ready for at least another six months.

Despite this, one programmer, who must remain unnamed, claimed to have hands-on experience of Sega's new hardware. He told **Edge**, 'It's *very* hot. It's easily more powerful than Atari's ultra-hyped Jaguar console. Saturn is basically just a spin-off of Sega's coin-op technology.'

The natural conclusion then is that Saturn is based on Sega's *Virtua Racing* coin-op... 'Oh it's more powerful than *Virtua Racing*,' says our man. 'Saturn, as we have it here, could easily do everything the *Virtua Racing* coin-op does and more besides. There's all kinds of specialised custom hardware that could texture-map the cars in *Virtua Racing* – making it look a whole load more realistic – without losing any of the speed of the original.'

In fact, the system described sounds more reminiscent of Sega's new coin-op, →

The Hitachi connection

Hitachi, it seems, have been instrumental in the genesis of the Saturn. Last autumn they introduced their SH7032 32bit RISC chip, which boasts digital signal processing (like in *Virtua Racing*) and high speed screen refreshing.

Hitachi approached Sega with the intention of licensing their chip technology for use in a 32bit game system. Following rapid negotiations, Sega and Hitachi formed a merger in September of 1993 and announced that Sega were to utilise the Hitachi chip in a 32bit system, to be available by autumn 1994, and also to research and develop 64bit chip technology.

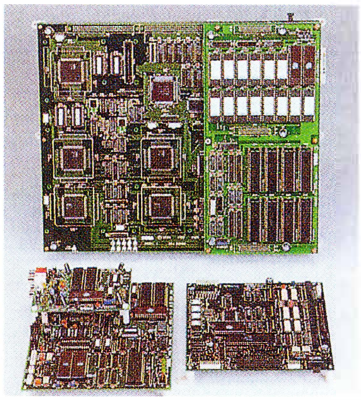
Some of Hitachi's technical staff are now permanently based in Sega's offices, under the auspices of their Saturn division.

Sega Japan for CATV

Sega's cable gaming technology is currently under test in 500 Japanese homes. The Tokyo Cable Network and Kandenko are cooperating with Sega to produce a game receiver for downloading Mega Drive games over cable networks.

A similar set-up involving AT&T in the States called The Sega Channel (see Edge two) is now expected to take place in March '94. Sega will first monitor the reaction of the 500 Japanese families playing host to the system and then decide whether to introduce the full system next year.

Between 50 and 100 titles will be available and the scheme is expected to cost between ¥2000-3000 a month (£12-18).



Sega's Model 1 PCB as used in *Virtua Racing* and *Fighters*. Saturn manages to squeeze all this into one console

← working title: *Daytona Racing*. The hardware powering that, the Model 2 system board co-developed with American giant General Electric (Model 1 can be found inside a *Virtua Racing* coin-op), is reckoned to be comparable with Namco's System 22 polygon texture-mapping system found in their astonishing *Ridge Racer* coin-op.

Fantastic as it sounds, such powerful hardware does make sense: it puts Saturn way ahead of CD^{32}, 3DO and Jaguar and makes it easy to port sophisticated coin-op games almost directly to the machine.

Sony's Epic team – responsible for generating software for the new PS-X system – have also experimented with the Saturn emulation hardware and have produced a demo which was reputedly more impressive than Sega's own. Sony hopes that by working on both systems in parallel, software is easily ported from one machine to the other, and this will help hedge their bets over the future of their PS-X system.

A 'Creative Centre' for Saturn software development has already been established by Sega, and the first titles mooted include *Virtua Racing*, *Virtua Fighters*, *Saturn Soccer*, *Outlanders*, *Record Of Lodoss War* (RPG), and something by the name of *Sonic*.

The Latest

information from our Sega contact is that there will be no cartridge port, and as expected, no downwards compatibility with Mega Drive software. Putting their faith directly in CD, Sega's Saturn boasts a quadruple speed (600K/sec) CD drive with a RAM cache of 4Mb to cut down on CD accessing time, plus a score/game save system.

An interesting rumour circulated in Japan when it was discovered that Sega have contracted JVC and Yamaha to develop the CD hardware. Writeable CD-ROM isn't really feasible for a low cost games system, but partially writeable? Whatever happens, Saturn's CD capabilities should wipe the floor with slowcoaches like 3DO and CD-i.

'It seems ludicrous to offer so many powerful hardware features if you're not going to include a CD drive,' agrees our informant. 'What's the point of being able to texture-map 3D polygons in real time if you don't have enough memory on a cart to provide all the data you want manipulated?'

One other viable alternative is 'playing by wire'. It is known that Saturn comes with all the necessary adaptors needed to plug into a TV cable network, and with The Sega Channel under test in the US and Japan, Sega have a cheap way of pumping games into Saturn systems, negating the need for cartridge or CD purchases of any kind.

Saturn is very much designed with the future in mind: compatible with HDTV (High Definition TeleVision) MUSE systems, it can display a Widescreen (16:9) image and can be used as a command system for interactive HDTV, such as quiz shows teleshopping and video-on-demand. There's even a rumour of a built-in voice recognition system. It really looks like Saturn is going to be out of this world. E

Saturn Tech specs

After the first tentative technical specifications (revealed in **Edge** one) the updated specs are as follows:

CPU: Hitachi SH7032 32bit RISC chip running at 27MHz

Custom chips: Sprite handler; polygon generator with texture-mapping/shading

Memory: 3Mb RAM; 4Mb cache on CD-ROM drive

Graphic display: 16,777, 216 colours, Widescreen (16:9) compatibility, with MPEG Digital Video as an option

Animation: 24 million pixels/frame

Sound: 32-voice PCM and FM

Release: November '94 in Japan

Price: $250-300 (£175-200)

When is it?

It's the year that Sony entered the videogame market. Working in collaboration with a large Japanese games manufacturer, Sony designed and built a powerful CD-based system, with potential for real multimedia...

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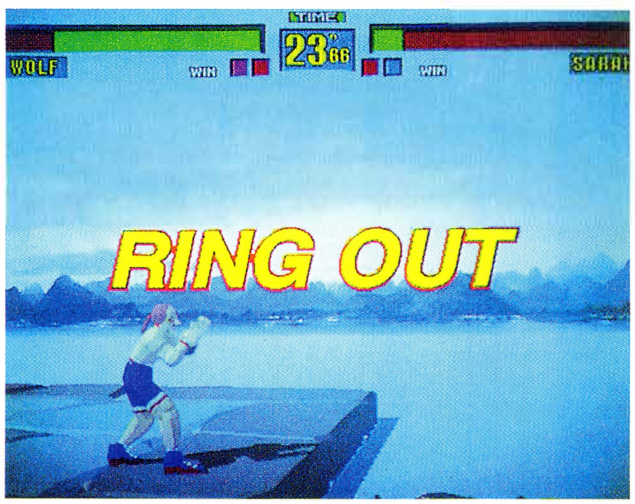
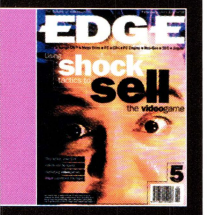


If the specs and rumours are to be believed, this time next year you could be playing a coin-op perfect version of *Virtua Fighters* at home



Following Sega, it's time for Sony's PS-X tech specs to be revealed, together with a still from a tech demo, powered by the 3D Graphic Engine chip, that truly does suggest that anything is possible. Meanwhile, Silicon Graphics and Nintendo continue to create something beyond cool – way past it, in fact.

head to head

'Nintendo have made their bed and now they'll have to lie on it. They have proven to be a great toy company but they are way out of position to compete in the new multimedia market.'

Trip Hawkins, president and CEO of The 3DO company

'I don't expect 3DO to be successful... They know marketing, we are developers. There's no way 3DO can beat us on the hardware side: it's impossible, they don't have the technical roots.'

James Clark, chairman, Silicon Graphics

it is...

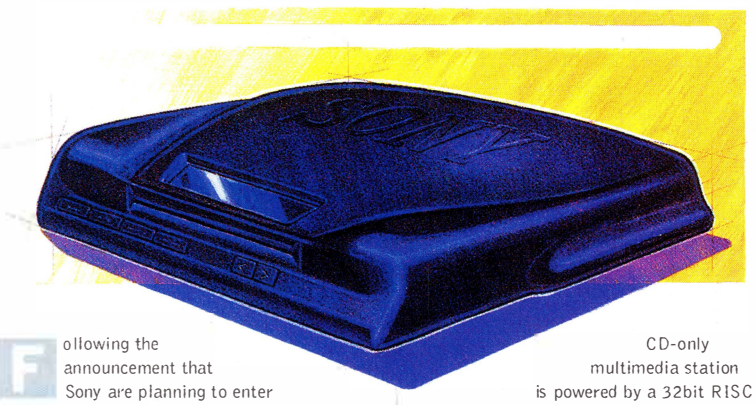
1991. Sony announce that they will be making the PlayStation – a Super NES compatible machine, running SNES games on CD. After producing working units, Sony and Nintendo fall out and the PlayStation dream dies. Until now...

Sony PS-X has the 3DGE

Continued

Illustration: Paul Kidby

With their PlayStation-X electronics giant Sony have entered the videogame market with all guns blazing. Edge runs for coverage...



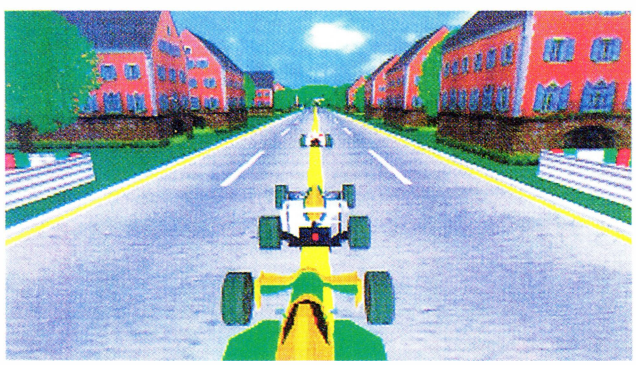
An artist's impression of Sony's PS-X machine. Good, isn't it?

Following the announcement that Sony are planning to enter the videogame hardware market (**Edge** four), some impressive details of the machine have surfaced.

Branded the PS-X (PlayStation X), this CD-only multimedia station is powered by a 32bit RISC chip, but has the assistance of a custom graphics chip called 3DGE (3D Graphic Engine). Reported as being more powerful than the 3DO's graphics engines, it is capable of handling 360,000 polygons simultaneously and has access to an amazing 4,000 hardware sprites.

Screen display is standard 24bit true colour (16.7 million colours), and so although no MPEG Digital Video compatibility has been mentioned, it will almost definitely be built-in or available as a plug-in cartridge. Sound is handled by an EDPSM (Electronic Digital Processing Sound Module) at a frequency of 44.7kHz, which is slightly higher than the CD sample rate of 44.1kHz.

Understanding the importance of a decent catalogue of titles at launch (Commodore and Atari take note), Sony is already busy attracting publishers and →



The first software for PS-X is this demo produced by Sony's Epic team. With texture-mapped polygons of this quality, anything is possible

Namco's jaw-droppingly smart *Ridge Racer* coin-op is among the first candidates for Sony's PS-X machine. Let's hope, eh?

On release this month

16 Mega Drive games reviewed in: MEGA

Highest rated: **NHL Hockey '94** 92%
Lowest rated: **Chester Cheetah** 47%

36 PC games reviewed in: PC GAMER

Highest rated: **Sam & Max Hit The Road** 93%
Lowest rated: **Strike Squad** 41%

14 SNES games reviewed in: INDEPENDENT SUPER NINTENDO MAGAZINE SUPER PLAY

Highest rated: **R Type III** 83%
Lowest rated: **Cliffhanger** 36%

17 Amiga games reviewed in: AMIGA POWER

Highest rated: **Liberation: Captive II** 91%
Lowest rated: **Doofus** 4%

Project Reality – SGI respond

Following Edge's report on the possible split between Nintendo and Silicon Graphics Inc, David Bagshaw, vice president of marketing at SGI, wrote to us: 'If the industry has not heard much from Nintendo on the project recently, it is because our two companies have stayed focussed on delivering a 'way past cool', next generation gameplayer based on Silicon Graphics' leading edge 64bit processor technology.

'Our work on Project Reality is proceeding on schedule. We are excited about the progress we are making, and are confident that the industry will be impressed with the resulting technology.'

So. That's told us. However, it still doesn't explain why a certain UK software house is working on 32bit graphics hardware for a leading Japanese games manufacturer. Stay tuned, sports fans...

← developers to create games for the PS-X and for arcade cabinets containing PS-X hardware. The first named title is coming from Sony themselves, a game enigmatically entitled *Warlock*.

One big ally in Sony's forthcoming battle is Namco. The two giant Japanese companies announced a tie-up on November 15, in which Namco is to develop and supply games for the PlayStation X, for release at the end of '94 when the PS-X is due to go onsale. They will also be working with Sony to apply Sony's technology to new coin-op machines, in order to produce high-spec, low-cost units, to further their share of the industry. However, this does not affect their collaboration with graphics specialists Evans & Sutherland for developing more ambitious 3D arcade-based projects.

The Sony deal

must be particularly pleasing for Namco's boss, Masaya Nakamura. At last he has a platform with which to compete – and beat – Nintendo, a company he despises. His rule over the Japanese games industry was broken when he was forced to sign a deal with Nintendo's boss Hiroshi Yamauchi: without the 8bit Nintendo market, Namco would probably have gone bust.

Namco's involvement is also important for several reasons: Namco are fast becoming synonymous with 3D development, having wowed arcade fans with titles like *Galaxian*^{3} and the forthcoming *Ridge Racer*. Obviously, these are prime targets for release on the PS-X, and it also gives credence to Sony's efforts: if Namco are interested in Sony's technology, then it must be pretty damn good.

Engineers at Sega have admitted that Sony's PlayStation will be more powerful than Saturn, although both machines represent huge leaps in gaming technology. But just to make absolutely sure. Sony is hedging its bets by developing software for both the PS-X and Saturn, so whichever system eventually takes off, Sony are sure to be backing the winner. **E**

Sony PS-X Tech specs

The first tech-specs for the machine have been released by Sony in Japan:

Main CPU: R3000A 32bit RISC chip running at 33 MHz
Clearing capacity 30 MIPS
Bus band width 132 Mb/sec

Custom 3D Engine: 3DGE chip for sprite handling; polygon generation
Clearing capacity 66 MIPS
1,500,000 polygons/sec (plain)
500,000 polygons/sec (texture mapped and light-sourced)

Data Engine: Clearing capacity 80 MIPS
JPEG/MPEG compression

Graphic display: 16,777,216 colours,
Resolution: 256X224 – 640X480

Memory: 5Mb internal RAM; RAM cards for status/high score save

Animation: 360,000 simultaneous polygons;
Maximum 4000 sprites (8X8 pixels) with scaling and rotation
No CLUT limit, no line restriction
Simultaneous playfields

Sound: 16 bit Stereo ADPCM at 44.1Hz, 24 voices

Release: December '94 in Japan

Price: ¥50,000

BUZZ words

64bit
cor **64bit** is like twice as fast as anything else out at the moment blimey just think all the games will be twice as fast with extra fast music that's it i'm off to the shops to get me a **64bit** clock to give me 48 hours in a day then i'm gonna get a **64bit** pair of trainers and win the 100 metres in the olympics yeah i'll be dead rich i'll get me a **64bit** Ferrari that'll go 400mph...

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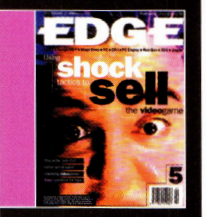
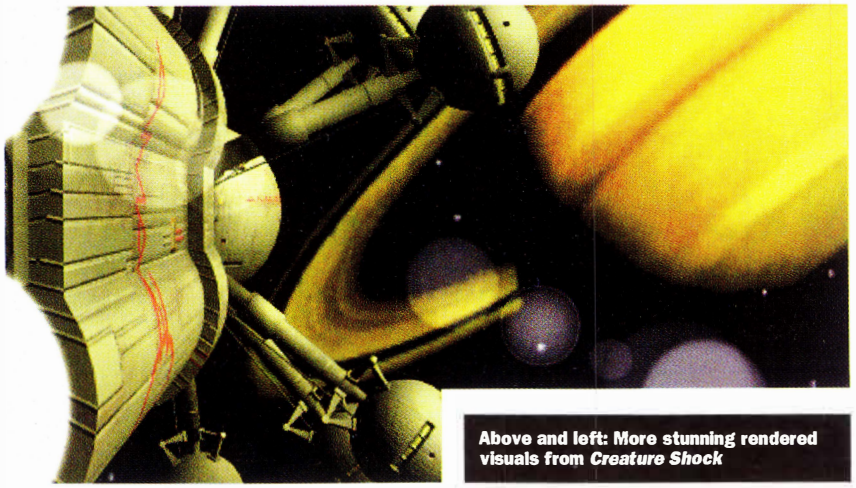
Creature Shock **in stunning 24bit colour. Virgin's game is expected mid-late '94**

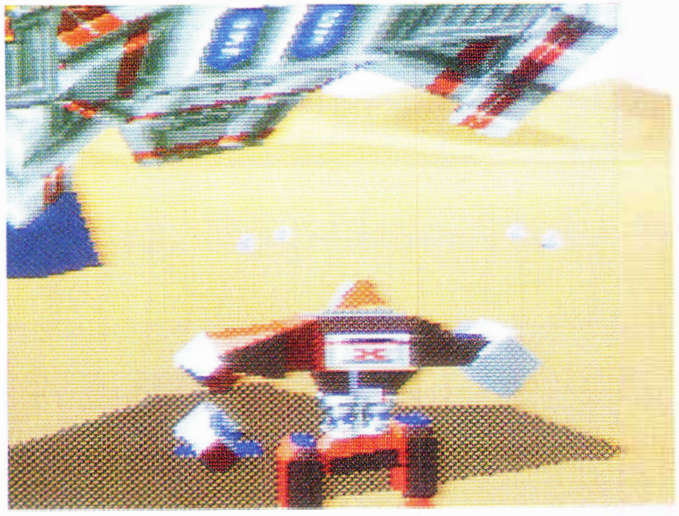


With fingers in so many pies, can anything stop British success story Argonaut Software? A visit to the company's HQ reveals a swathe of projects in the works, and not all of them leaning heavily on prerendered graphics sequences. Certainly the Super FX-powered Transformers title will be one to watch…



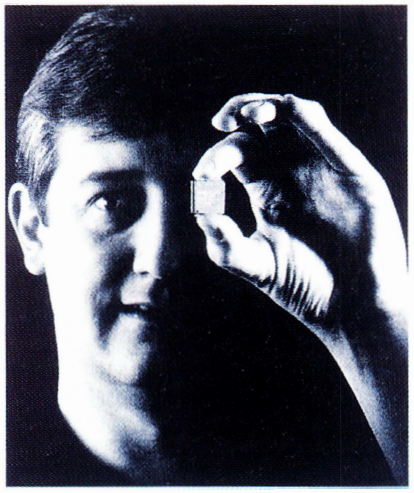
Above and left: More stunning rendered visuals from ***Creature Shock***

Primeval **– Sony's new arcade adventure Right:** ***Citadel*** **– Argonaut's new SFX title**



EDGE magazine February 1994

Argonaut Software



The Super FX chip as modelled by one of its creators, Carl Graham. Small is beautiful

Producing 3DO and PC CD-ROM games for Sony and Virgin, and Super FX games for American third parties – that's the Argonaut Software of 1994. And all this while still in bed with Nintendo. **Edge** investigates...

Since establishing Argonaut Software at the tender age of 16, Jez San has landed on his feet time and time again – with his company now one of the most prominent in the business.

But apart from *Starglider* and its technically stunning sequel, it's difficult to find cast-iron logic to support the company's spectacular success. Some of the games that followed were poor, and even *Starfox*'s qualities can be traced back to the talents of skillful Japanese game designers.

In fact, the harder you look, the more you begin to wonder how they ever forged such intimate links with Nintendo. And where they'd be now if it hadn't happened.

Anyone expecting flashy offices and fast cars, would surely be massively disappointed visiting Argonaut's offices. Located in North London, the battered and slightly cramped building is about as unglamorous as it can get in this business – it's a small wonder that some of their programmers jumped at the chance of working in Japan.

Walking around the offices, however,

Continued next page

prescreen

Musician Gwynn Jones draws inspiration from those mega talents Take That (see poster)

things start to improve. There's a cheery enthusiasm for the multitude of projects being juggled, and reassuringly, there's some heavyweight and very long-awaited games hidden away in some dark corners. Naturally **Edge** was only too keen to have a nosy around.

At present, Argonaut's Japanese connection means that it gets to shape the development of a line-up of Super FX games, and if rumours are to be believed, also to take on the challenge of developing Nintendo's next generation games machine using Silicon Graphics hardware. But there are some things Argonaut just doesn't like to talk about. And Nintendo's Super FX games are similarly cloaked in secrecy.

As reported in **Edge** three, *Starfox II* is currently being coded in-house in London, while *FX Trax* is being handled by two temporary Argonaut defectors, under the auspices of the game god himself, Shigeru Miyamoto, in Nintendo's Kyoto headquarters in Japan. That's not to say that Super FX games weren't on view at Argonaut, though. In fact *FX Trax* looked rather like a polygonized version of *Buggy Boy*. The game moved smoothly and even incorporated texture-mapped roadside objects, handled by the SFX II.

And given that the first Super FX game, *Starfox*, made such an impact, much is expected of the sequel housing the new improved Super FX II chip. Running approximately 30% faster than the original Mario chip (the real name for the Super FX), the SFX II delivers about the same power as a 386 PC running at around 20MHz. While still widely acclaimed, *Starfox* was only ever criticised for its simplistic shooting nature and the fact that you were never given any real freedom of movement.

As already reported, the Super FX II chip in *Starfox II* allows for two simultaneous play windows, permitting head-to-head battles and more depth of gameplay. And the graphics are currently looking on a par with the original's – but with a bigger screen display and even a mode where both players can fly in a single fullscreen window.

'Level one of *Creature Shock* has already bitten a hefty 200Mb chunk out of a CD-ROM'

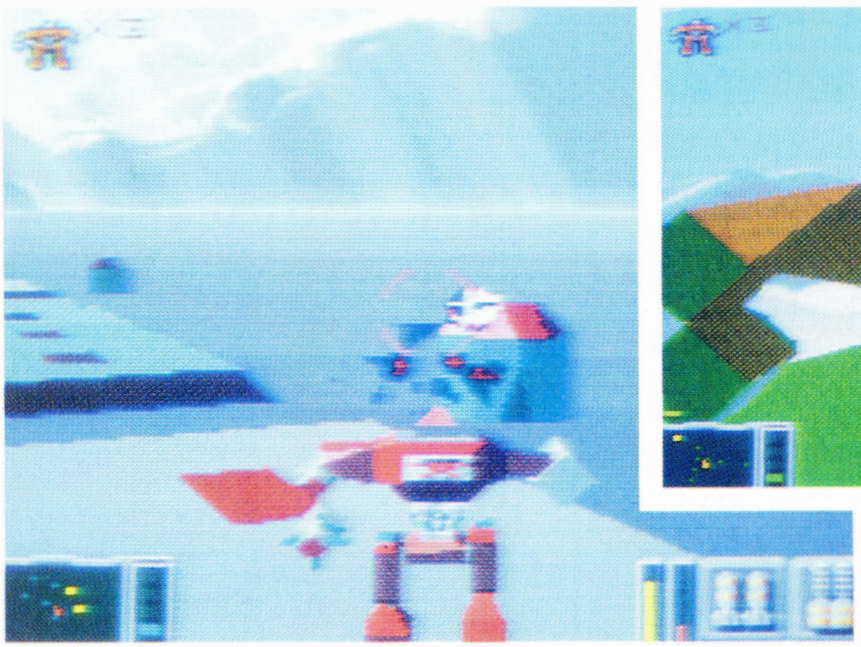
Mark Johnston, programmer

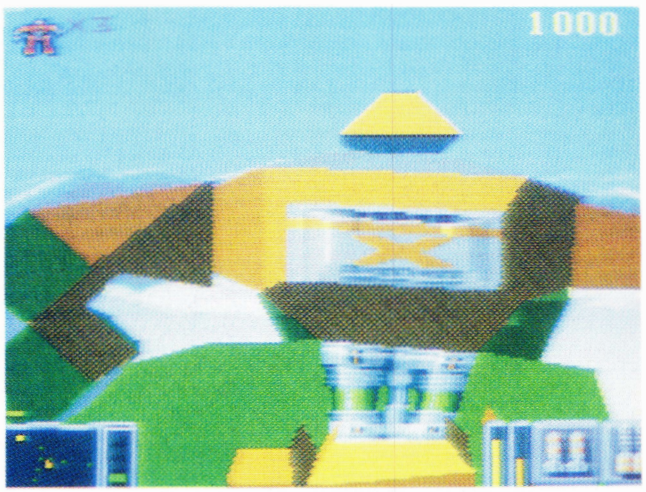
Marcus Punter, graphic artist on *Creature Shock*, with (deep breath) Product Support Group Manager (Software), Ian Crowther

But, while **Edge** was granted a look at both *Starfox II* and *FX Trax*, Argonaut were far more willing to discuss their first thirdparty Super FX release, *Citadel*, being coded for US publishers Electrobrain.

3D graphics specialist **Michael Powell** (*SubWar 2050*, *Powerdrome*) heads the *Citadel* design team and is confident that this will be different from *Starfox* in many ways.

'Unlike *Starfox*, this is a totally free roaming game. You have complete freedom to go wherever you want. The 3D system





Like *Starfox*, *Citadel* (left) places 3D polygon graphics over bitmapped backdrops. The action allows for complete freedom of movement, too, unlike Nintendo's classic. Sometimes your robot will zoom into the screen (above) – the SFX II handles it easily

has also been improved, and we now have added texture-mapping on some of the objects. The main character in *Citadel*, for example, is far more detailed than Fox McCloud's *Starfox* fighter, comprising around 90 polygons.'

In *Citadel* you have control of a huge robot character that can transform into different crafts like airborne jets and land-speeders, each using varying amounts of fuel. Unlike *Starfox*, there's a fair degree of strategy to the gameplay incorporated in the three training missions and six different worlds. It's a far bigger game, and surprisingly only a 4 Mbit cartridge too.

However, first impressions might lead you to believe that this is the Transformers licence that Argonaut are rumoured to be working on. Not so. Takara's game, an officially licensed Transformers product, is also being coded by Argonaut in London, but it's a different game from *Citadel*, even if it does look very similar at this stage.

Citadel is currently 1½ years down the line, with around another four months of work still to go into the project, and while it looks basic in terms of graphics, Argonaut's 3DO and PC development is guarded with almost as much secrecy as their Super FX work. Two projects are currently in the pipeline: *Creature Shock*, an action-based sci-fi shoot 'em up for Virgin; and *Primeval*, a firstperson action game, currently at a very early stage.

You'd think that sitting at monitors all day would breed a distaste for videogames. Not so. The Sega Dome, in the Japanese Yohan Shopping Centre, is one of the boys' more regular hang-outs

You might think it surprising to hear that Argonaut aren't the greatest fans of 3DO. 'It's good at texture-mapping, but it's not as fast as a DX2 PC for calculating polygons', claims Argonaut's 3DO programmer **Mark Johnston**.

'The ARM chip (CPU) is slowed down by the lack of a disk cache and the machine's pretty hopeless at creating some of the more traditional special effects players are used to,' he adds. 'Because it's only got a single screen like a PC, effects like multi-layered parallax scrolling are virtually impossible to get running in a single frame. In this kind of game the SNES wipes the floor with it, which is a bit sad when you consider the price difference.'

Well, yes it is, but for 3D sprite-expansion – the machine's forte – 3DO's no slacker. And *Creature Shock* has lots of that, reverting between pre-rendered 3D walking bits and 3D space shoot outs throughout its six levels.

In the shoot 'em up section the action's viewed from behind the player's ship, like in *Starfox*. The player flies into the screen in a similar style to the Sega coin-op, *Galaxy Force II*, with real-time rendered rotating sprites zooming past you before you meet an end of level boss.

It sounds hackneyed, and it is, but take it from us, the speed and smoothness at which it's all executed is impressive, with everything expanding without any of the blockiness usually seen; and that's with some of the sprites almost filling the screen. 'I think the best aspect of the 3DO

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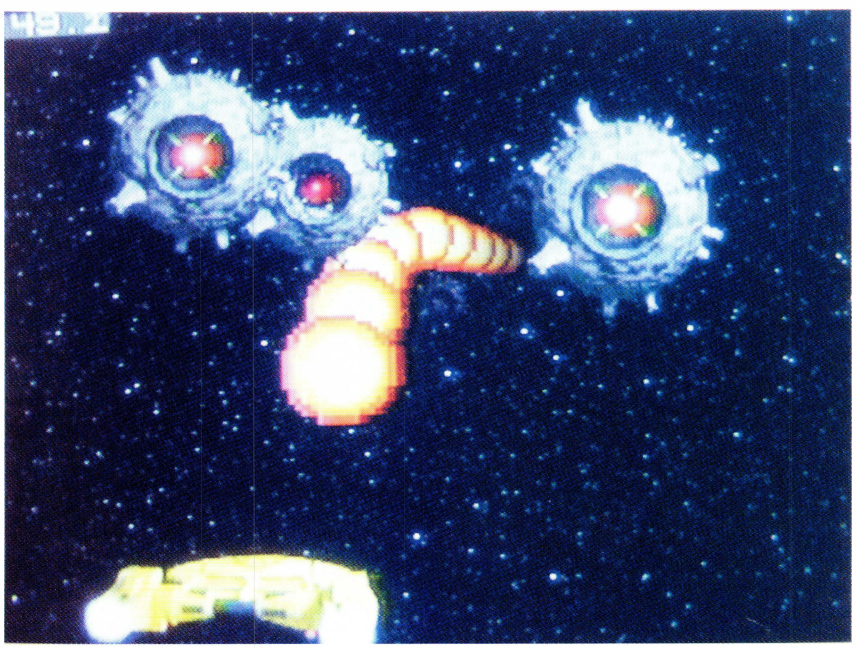
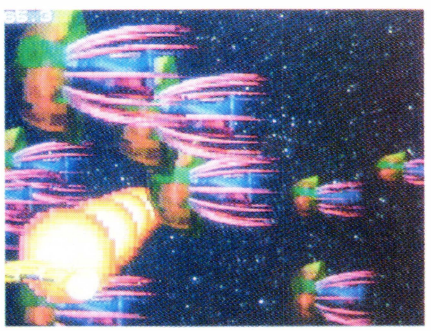




While Argonaut moan about the 3DO hardware there's little evidence onscreen of the shortfalls in *Creature Shock*'s space shoot 'em up sections – everything whizzes into the screen at an alarmingly smooth rate. And those stretching squid (above) are great

prescreen

The *Primeval* team from left to right: Junior Walker, Neil Gregory and John Woolf. Only another year's work to go on this one

is probably its operating system, which is very easy to use,' Mark reckons, 'but having all the development based around Apple Macs makes it a very expensive machine to work on.'

The other half of *Creature Shock* takes place on foot as your space-suited character negotiates *3D Studio*-rendered tunnels in true CD-ROM-o-Vision.

You know the form by now – select your direction and a piece of video plays, and then it stops and you do it again. It's the same principle as seen in *The 7th Guest*, although naturally, Argonaut reckon theirs is a far more sophisticated technique. 'It's a bit more interactive because the video clips are much shorter, quicker to activate, and there are far, far more of them.'

Once you reach the rooms, there are either large static background screens which scroll around as overlayered rendered sprites with hundreds of frames of animation move towards you in an *Operation Wolf*-style shoot 'em up.

There are also large rendered fight sequences, where you have a fully rendered animated monster pulled off the CD revealing its sprite-masked weak spots as it moves. According to Mark, 'We're also trying to integrate subtle things that'll give the gameplay more interactivity, such as small creatures that attack you if you stand in certain places.'

Original it ain't, impressive it most definitely is. And fun? Well, only time will tell – at least six more months in this case – but **Edge** certainly hasn't been that impressed by previous attempts at this kind of thing.

'We're trying to use subtle things to give the gameplay in *Creature Shock* more interactivity'

Mark Johnston, programmer

'*Creature Shock* started out way back when CD-ROM drives were a just a possibility for the PC,' Ian claims. 'We're going for a straight arcade action game because we couldn't build in a detailed level of interaction into a pre-rendered graphics system like this.' But CD-ROM-o-Vision is still good for one thing – it sure makes use of all that disc space. 'Currently, level one in the game has already bitten a hefty 200Mb chunk out of a CD-ROM, so we're a little over budget so far in terms of disc space.'

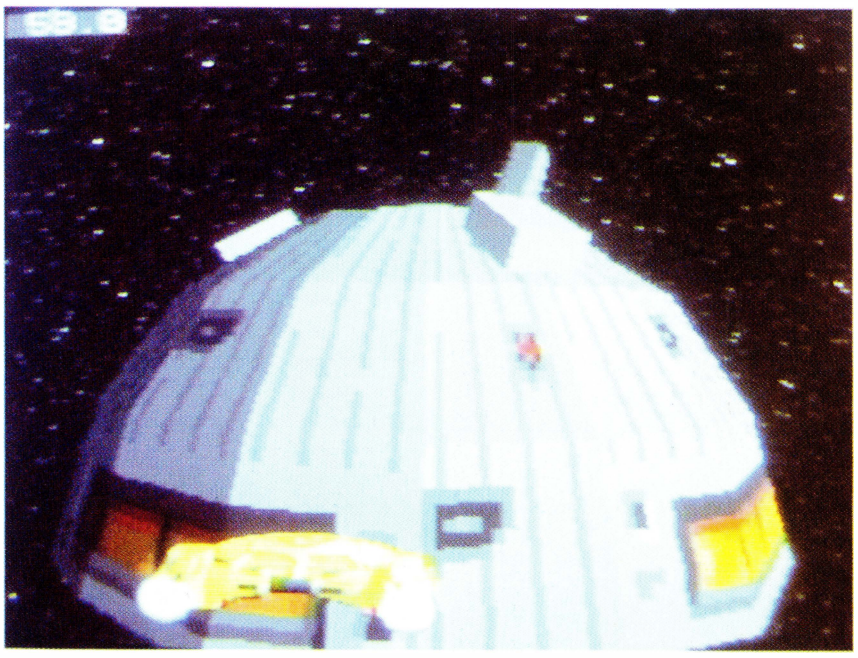
So much for yesterday's dreams of CD offering limitless space.

Undeterred, Edge tries a novel approach at getting screenshots. Now, zoom in...

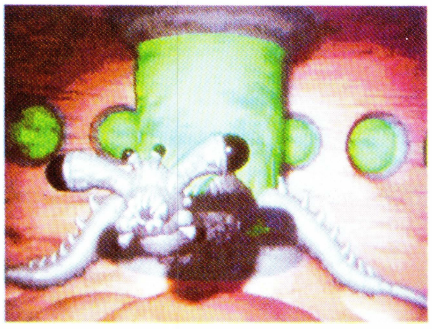
Besides the 3DO and PC

CD-ROM versions there are possibilities of FM Towns, CD-i 2 and just about any CD console versions of *Creature Shock* appearing. It's the kind of game that'll transfer fairly easily across, providing the machine can handle the real time 3D space sequences and flow of data for the video.

'The 150K per second drives on the PC are irritatingly slow,' claims Ian, 'it really restricts the colour and detail we can achieve on the PC.' And on 3DO? 'Well,



More from the space sections in *Creature Shock*, in this case, level two. The gameplay alternates every level between firstperson perspective walking bits (right) and these 3D scenes



Boss creatures are rendered completely and use masked sprites for collision detection

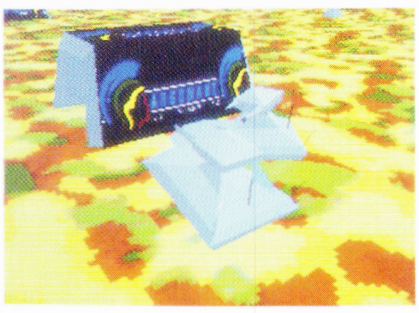
there'll certainly be better colour resolution, but it won't necessarily be using more colours.' And the results **Edge** saw testified to that – the 3DO FMV scenes looked less fuzzy than the same scenes running on the PC.

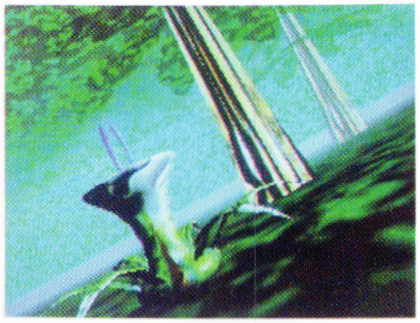
Primeval, the other 3DO and PC CD-ROM project, is a similar concept, currently about a year away, with lots of *3D Studio*-rendered graphics and gameplay that's cut of similar cloth.

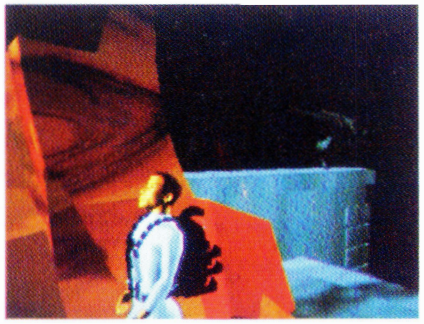
At first there were also lots of rendered dinosaurs in the game until the publisher, Sony, decided to have them ditched. 'It's true,' recalls Ian Crowther, 'Sony had obviously been mightily impressed with the dinos in *Jurassic Park* and was asking for a big lovely CD-ROM dinosaurs game. We warned them that it would take about 1½ years to fully complete something like that, by which time dinosaur credibility might have waned a bit. But they kept jumping up and down shouting 'Dinosaurs! Dinosaurs! We want dinosaurs!' and we plugged on with them.

'Recently however, Sony decided that dinosaurs were old hat so we had to kill the lot of them. Consequently, we're still rebuilding the plot in this one. It's a bit like building a house and then having to pull it down and build a hotel.'

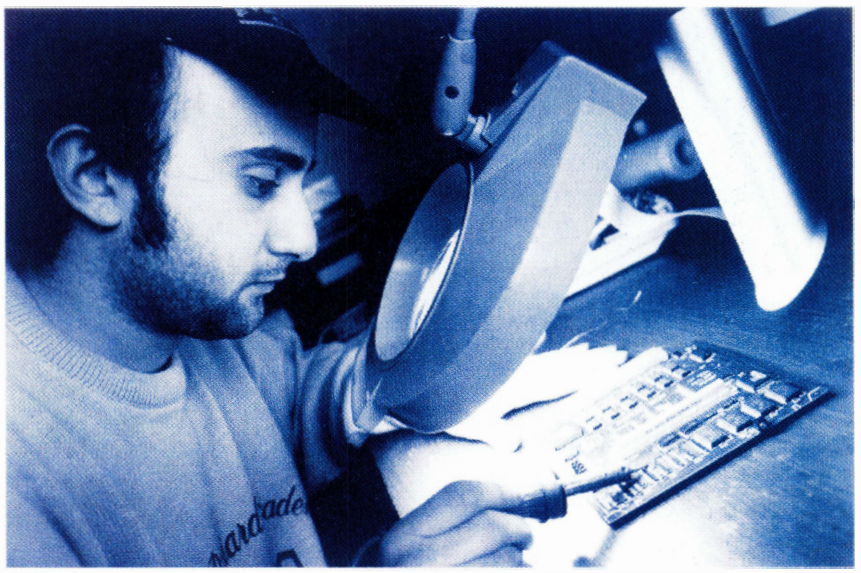
Graphic artist **Junior Walker** explains the basis of the new plot: 'We've since been working on an alternative scenario – an alien who crash-lands his spacecraft on earth and has to find a way of getting some fuel to escape. Your character – the alien – is the good guy. He's a conservationist who tries to save things, particularly endangered species. This only leaves the human race as the bad guys, and the gameplay might even involve you tracking down a deadly criminal while being hunted down yourself by the police robots.' The style of play will take a similar form to the walking sections in *Creature Shock*, although with more over-layered sprites, and different perspectives.



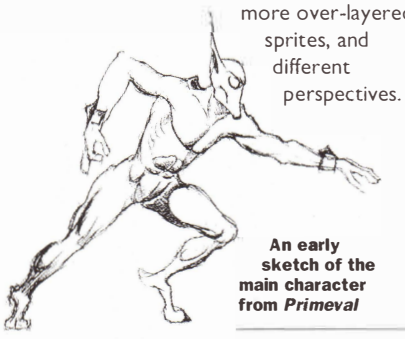




When not working they're playing – in this case, on their own networked 3D tank game created for purely recreational purposes (left). An early intro scene from *Primeval* pans around (right)



Besides software, Argonaut are one of the few companies heavily involved with chip design for certain large companies in the games industry. The Super FX chip is only the surface...



An early sketch of the main character from *Primeval*

'We're going for an entirely real time interactive game with *Primeval*,' reckons Ian, 'there's no waiting for the CD to get to the end of the sequence, and when we do play a sequence, your real-time character is overlayed on top.'

It's ironic that such advances in graphics technology make traditionally established gameplay elements – such as direct character control – seem so alluring.

Why should players accept a step back in gameplay simply to accommodate better graphics? With the Super FX, there's obviously little to be concerned about – the very nature of the chip determines that games can be interactive.

But let's hope Argonaut don't get too blinded by CD-ROM technology to forget about the player with their other new games...

Credits

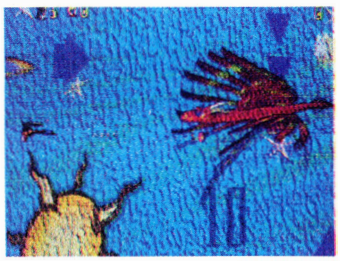
PSG Software Manager: Ian Crowther
Programmer (CS): Mark Johnston
Programmer (CS): Lewis Gordon
Graphics (CS): Scott Butler
Graphics (CS): Marcus Punter
Graphics (CS): Peter Day
Programmer (Ctl): Michael Powell
Animation player (CS): John Woolf
Designer (Ctl): Nic Cusworth
Graphics (Ctl): Alistair McNally
Music (Ctl): Justin Sharvona
Programmer (Prvl): John Woolf
Graphics (Prvl): Junior Walker
Graphics (Prvl): Adam Barton

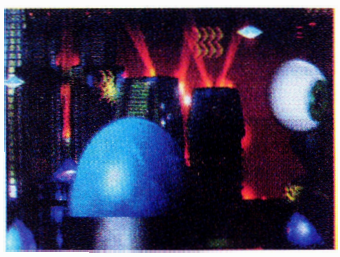
EDGE magazine February 1994

Trevor McFur In Crescent Galaxy

Format:	Jaguar
Publisher:	Atari
Developer:	In-house
Price:	£50
Size:	16 Meg
Release:	Out now

Shoot 'em ups need end of level bosses, and *Crescent Galaxy* has plenty of those. Unfortunately, they're all so two dimensional that they don't really add anything much – nice use of colours though





Although visually impressive, *Crescent Galaxy* is a sad attempt at a horizontally scrolling shooter. Poor game design and weak sound send this title to the bottom of the class. The Jaguar deserves better than this...

Just when you thought the door to the next generation of videogames was beginning to open, along comes *Trevor McFur In Crescent Galaxy*, to slam it firmly shut in your face. Without doubt, the 64bit Atari Jaguar – or 'Jagwarrr' as it's pronounced in the States – is capable of much, much more than this.

Crescent Galaxy may look fabulous in these static screenshots, but what you can't see is the way it plays. Lurking – hiding almost – behind these impressive visuals is one of the weediest shoot 'em ups ever produced. It's so feeble in fact, you end up feeling sorry for it.

So what is it about *Crescent Galaxy* that makes it so bad? Well, the first thing you're going to notice is the sound that accompanies each shot – it's so laughably weak, you'd be forgiven for thinking you've just plugged in your old Atari VCS by mistake.

Also, your ship also has a distinct lack of firepower. Power-ups don't help much and the special weapons aren't, well, special. The levels themselves are all very basic in design, with only two layers of parallax at one time, and the whole game scrolls only horizontally. Nowadays this is barely acceptable on a 16bit machine, never mind a 64bit one.

Crescent Galaxy has some well rendered visuals, especially the bosses, but it's totally let down by its badly implemented gameplay.

If it had more variety in the levels, less random enemies, bigger and more powerful weapons to use, more depth and infinitely better game design, it would have been a great Jaguar release. If only...

Edge rating: **Four/** 10

ISSUE ONE
PLAYSTATION 3
BOXED
EDITION

New magazine on sale
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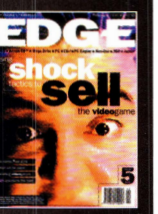
Future
MEDIA WITH PASSION

PLAYSTATION 2 PLAYSTATION PORTABLE **PLAYSTATION 3**



dge reader Martin R ilson comes along interview David aben. Tiptoeing ound the fauna and mputer hardware, e wonders if aben's video llection has had a earing on his output date, what lies in ore for the CD32 rsion of *Frontier*, nd why he's so nvinced 3D gaming the way forward.

Photographs: **Adrian Ford**

David Braben – his first game, *Elite*, sold 750,000 copies and set him up for life. And he has spent the last five years programming the sequel, *Frontier*. Edge met him at his Cambridge home...

An audience with: David Braben

Master programmer, and *Elite* creator, David Braben, meets **Edge...**

Once more an **Edge** reader is hastened into the presence of a top game creator, as this month Martin R Wilson meets David Braben. There can't be a being in the whole solar system who hasn't played *Elite* on some platform or other. The game is simply one of the most enduring classics of the computing age.

You will recall that in **Edge** three we said if anyone had any questions for David Braben we'd give them the chance to ask them to the *Elite*-meister in person. The best questions came from Martin Wilson, a 29 yearold gamer from Somerset.

David Braben has a house in Cambridge, a wife, two cats, a handful of tropical fish, a Yamaha Dolby Surround processor, and two large terrapins in a tank in his front room. On the computing side he has an Amiga 4000, 2000, 1000, Atari ST 1040 with 4Mb or RAM, and 'an Atari Hard Disk which propels itself across the desk unless there's a monitor on top of it'. He also has an Archimedes A440, and even a prototype Archimedes he got from Acorn (codenamed the A500), plus a selection of PCs including his main 486 66MHz and a laptop 386 25MHz. Right then, tea and coffee sorted, let's jump into the fray...

Words by **Edge**
Questions by **Martin R Wilson**
Answers by **David Braben**

Martin Where did you get the idea for *Elite* from?

David Braben A very long time ago I wanted to do a 3D space game, and I started doing one on the Acorn Atom. Just messing around really, because I discovered you could draw lines very quickly so you could do 3D very easily. Then I met Ian Bell, and it ended up a joint project. The trading was added as a justification for it.

Martin Can you pinpoint any outside influence which pushed you into doing a 3D space game – like for example those Star Wars videos on your shelf?

David It's things like that and science fiction books. Mostly I wanted to do 3D because nobody had done it. And space is the easiest field to apply it to.

Martin With a land-based game you do lots of X and Y but not much Z...

David Yes. We had great fun doing *Elite*. I suppose the sequel *Frontier* was a logical thing to do at some point. To flesh out what we didn't finish in the first one. I never wanted to call it *Elite II*, but it was suggested it would be a good idea for marketing reasons – which is a shame because it's a bit tacky just hanging a

number off of something.

I imagine for future versions we'll probably drop that. They're a way off yet, we haven't even started doing them.

Martin What was your background in programming?

David I got into it as a hobby while I was still at school. I did a degree – physics at Cambridge – and specialised in electronics. Then I wanted to do a PhD in computing. But they didn't want me to because I didn't have any computing qualifications, so I spent one year doing a computer science diploma, but then decided I didn't want to do a computer science degree anyway. We wrote *Elite* while we were at University, and that was the hobby. Then it switched round and University became the hobby.

Martin How's *Frontier* been selling?

David It's been going really well. It was a shame that the US release wasn't simultaneous, as it could have been. It's always a problem distributing over there. Also Gametek US is fairly separate as a company, and getting it printed in the US takes ten times longer than in the Europe.

Martin Are initial US print runs bigger?

David I get the impression that they're smaller. Typical computer people don't follow the magazines so much. Gametek reckon that PC people are slightly less aware of the magazines on average than Amiga people.

Martin Did you actually write the Amiga version?

David I did, yes.

Martin And someone else is converting the PC one?

David Chris Sawyer did the PC version.

Martin Wilson, Amiga and PC owner, and Edge's interviewer for the day

Martin: 'The Amiga version of *Frontier* is quite jerky and slow in places. Do you think it would be faster if you used line vectors instead of polygons?' David: 'Yes... but it would be unworkable'.

Up in Scotland. Most of the data is the same on both machines, so that's why the PC version caught up so quickly. As soon as the data was done for the Amiga we just transferred it straight over to the PC. The PC version was completed a matter of days later than the Amiga version.

Martin What about the ST version, why are you doing that, what with it being a declining market?

David Well, because one of the surefire ways of making it decline is by not supporting it! The advance orders are quite good, I'm surprised. Like tens of thousands, not hundreds. It's not that difficult a machine to support. It's actually quite a lot like the Amiga internally. Especially since this is such a long project. Five years ago, who could've told which would survive?

Martin Any real differences between the ST and the Amiga version?

David Not especially, no. There are certain things in the ST version which are not in the other versions because they're not needed. Like a lot of the early STs only do 512 colours, maximum, but the game internally uses a lot more. So there is an option on the preferences screen to simulate 4,096 colours by doing adjacent shades on consecutive Vertical Blanks. Given that I'd written the code I'm damn well going to use it! What I'll do is see how it sells on the ST and if it's rubbish I'll probably not bother in the future.

Martin Are there any updates to the software, is that still going to happen?

David Oh yes, definitely. Hopefully new versions of the game which will either be whole new games or add-on modules. The way I see *Frontier* is as a really good platform for doing science fiction adventures. If you like, this is just the basic game. Certainly I always have lots of mission ideas. But what I'd like to do is take advantage of other machines, and probably do something for the CD^{32}.

Martin How will the CD^{32} version be extended? Extra music?

David Probably. I'll look into that.

Martin Because really the beauty of *Frontier* is it's so compact, you could fit it on CD 1,000 times...

David I guess we'll use it for extra music and extra sequences, because the problem with disc-based games is seek times. Unless you've got a really linear game it's almost impossible to eliminate the seek time because it's up to the user where they go.

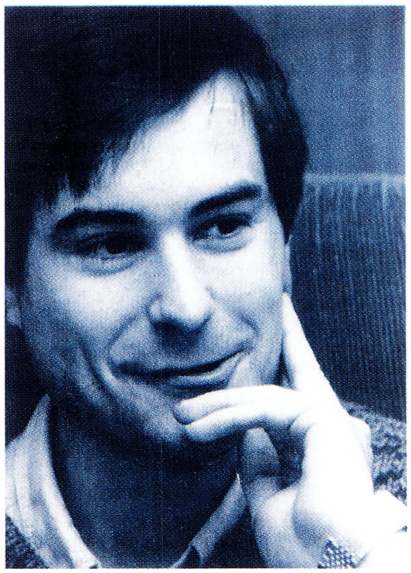
One thing I thought was sad about the 3DO's *Crash 'n' Burn* was that you get a huge number of seconds of black screen right at the beginning. I'm very surprised that they just didn't knock up just the title screen and then do the loading.

Martin The Amiga version of *Frontier* is quite jerky and slow in places. Do you think it would be faster and more playable if you used hidden line vectors instead of filled polygons, like the old *Elite* graphics?

David Yes, it probably would have been faster, but it could look very, very messy and it would be unworkable. If you set the detail level to low that's not far off what you're getting now, and it does dramatically

Continued next page

interview



David: 'I've never really set out to be a game designer, I suppose'...

improve the speed.

Martin What about the PC version?

David Yes, it's quicker. But PC's are an absolute nightmare, I hate them because there are so many different standards. One nice thing about consoles is that they all tend to be quite similar. The CD32 is nice because it uses Amiga architecture, and that's so painless from a programmer's point of view. With a PC you can test something and it'll work fine, but with a different sort of EMS driver the whole thing might fall down.

Martin On to the Jaguar. Is there going to be a version? I mean that could be *the* one couldn't it? Smooth, detailed...

David Not planned, as yet. I'm always quite cynical about Ataris because at the moment the Atari name doesn't really inspire confidence. It's not a criticism of the machine. For someone like me, getting something up and running on CD32 is easy and any time spent isn't wasted. The Jaguar is a very different machine, and much as it would be great to do something on an exciting machine like that, well, there are always new machines on the horizon.

Martin Why have you spent most of your life doing 3D games?

David I've always been interested in 3D but I haven't only done 3D games. In the very early days when I was still at school I used to write other games for my own amusement. I had an Acorn Atom which I dangled lots of stuff off.

It was tinkering around for a hobby and then I twigged that I could probably sell some of these games. Myself and a friend did a demo of *Elite* and showed it to various people including Thorn EMI, who were the people that we wanted to sell it to. But they didn't want it so we went to Acorn, who took it.

Martin But why design in 3D?

David I never really set out to be a games designer, I suppose. 3D has always interested me and I've never really wanted to do *Super Mario* style, frustrating kind of games, because they're very difficult. *Elite* was more fun because it's not as if you're working to a goal or a score, it's more a case of simulating what happens. With *Frontier* there is always a sense of feedback.

Martin Were you asked to do *Frontier*?

David No I started out with Ian Bell, and we got it to be playable on a BBC Micro but we decided that it just wasn't good enough to sell, so we shelved it and started again a lot later – just me by then – supporting the higher end at the time, like the ST and the Amiga. I actually started on the ST so it just shows how long ago it was... When PC's still had CGA graphics.

Martin From that early idea what did you add to the game?

David I'm extremely into astronomy and I really wanted to have a much more realistic backdrop for the game. Like the fact that planets happen to be moving so fast that they're very hard to catch up. I haven't seen any other game where the planets actually move at realistic speeds or with realistic orbit lengths.

Martin What of the future?

David Sadly the days are over of one person writing a whole game, in the way I've worked on *Frontier* – working alone for three of the nearly six years. So I'll set up a small programming group to do conversions to other machines and to enhance the current ones. I hope to be producing new versions of *Frontier* for at least the next 5-10 years. There are still versions of *Elite* that haven't come out yet. Like for the SNES for example!

Martin Is that going to be vector or filled polygon?

David Polygon.

Martin: 'So David, why have you spent most of your life doing 3D games?'

Martin What abut virtual reality clobber? Gloves and stuff? Are you going to get involved in any of that?

David I think that stuff's a distraction. The thing that's important with virtual reality is not the actual 3D, but the fact that when you move your head the display moves. From the point of view of the game it's just another input/output device. But this also makes it very easy to add late in the day. Generating the 3D images you just generate the offset by a small amount.

With *Frontier* the way we could do it is let you look around the cockpit and have all the displays visible in a virtual reality way. But that wouldn't really affect the internals of the game at all.

As soon as someone makes a machine to do all that, I'll program it, but until then it's not my problem...

Martin Thanks David.

Next time...

More **Edge** readers will be accompanying us on our next two interviews: with **Archer Maclean** (the man behind *Super Dropzone* on the SNES), and with the programming team at **Argonaut Software** (the designers of Nintendo's Super FX chip and the programmers of *StarWing*).

All you have to do is send in one question for either one or both of these interviews before January 20th. And if you ask the best, most searching question, you'll be the one to go along.

Address your questions to **Edge**, 30 Monmouth St, Bath, BA1 2BW.

Continued

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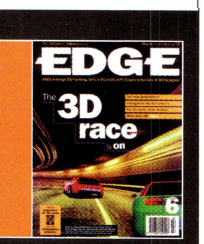
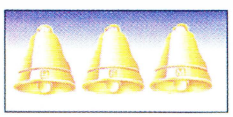


Hit 16bit platformer *Zool* is the starting point for a new initiative that promises British developers and publishers an entry point into the arcade business. Can it succeed where the Amiga-powered, Mastertronic-backed Arcadia coin-op, running games such as *RoadWars* and *Xenon*, failed?

Zool: first PC game to hit arcades

Developers ATD and coin-op experts Bell Fruit have produced a new system that allows easy conversion of PC games to arcade format. *Zool* is their first subject. Edge reports



Attention To Detail: 0926 843444; Bell Fruit Manufacturing: 0602 706707

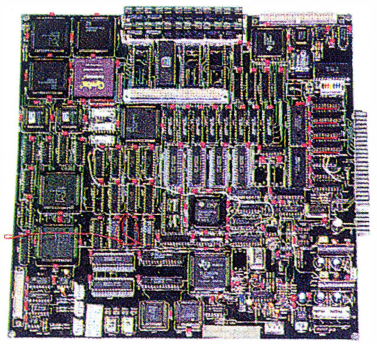
The completed *Zool* running in a standard cabinet. Bell Fruit will produce dedicated units for distribution in pubs and arcades

Gremlin's *Zool* is about to become an arcade hero thanks to a new coin-op system jointly developed by Attention To Detail, and Bell Fruit Manufacturing who provided the funding for the first machine.

ATD – who helped debug the Jaguar chipset and developed *Cybermorph* for Atari – have invented a dual hardware/software system based around an Intel 486-type processor. So, as well as running a 256-colour *Zool*, their system can easily have PC compatible software ported to it.

Bell Fruit Manufacturing – who will be using the new hardware in their *Zool* cabinet – are hoping to harness the games community in the UK to write programs for the system. They are already talking to several companies who are all keen to get their PC games in the arcade – without having to shell out on dedicated hardware.

Martin Green, R&D director of ATD and inventor of the system explains: 'The kind of thing you'll see is conversions of products already in the market, or new products written by PC games companies. The UK games development community is very well represented on consoles, but have a low profile in the arcades – this may help to change the situation.'



ATD's prototype 486-compatible coin-op board. The finished article will eventually be at least half the size

'Of course, when you say arcade, the ones people talk about are the ones at the top – the *Virtua Racers*, *Galaxian*^{3}s, *Ridge Racers* – those machines are all well over £10,000 apiece. Our system is much cheaper and very scalable.'

The clever part of the new system is that it only uses a small custom hardware component – around 5,000 gates – and most of the work is done in software. 486-type processing is used because it's relatively cheap and eases the process of portability.

However Martin points out that 'There is a massive range of 486-compatible processors on offer which give us a lot flexibility. For an extra £150 onboard cost, we can use a DX2/66 and double the performance. We've also got our eye on some of the new RISC chips, like the DEC Alpha – 20 times current performance for only £300!'

ATD see

bus bandwidth (the amount of data the architecture can handle) as the main problem with much existing hardware. As Martin says, 'A wide databus is like having a great big truck: it's great for hauling tons of stuff around, but if you want to take something down the road it's useless.'

The new system eliminates this by →

Data stream

Biggest selling 16bit console game of 1993: **Mortal Kombat**

Total amount spent on marketing *Mortal Kombat* in the UK: **£2.2 million**

Number of football games either released or due for release between December 1st and July 1st: **11**

Number of football teams from Britain participating in the World Cup: **0**

Number of computer and videogame magazines currently clogging up the shelves of all good (and most bad) newsagents: **59**

Title voted Magazine of the Year by the great and the good of the games industry: **Edge**

Number of consoles in use in the UK as of 1st January 1994: **9.4 million**

Number of exhibitors at this month's US Consumer Electronics Show (CES) in Las Vegas: **79,000**

Total floor space covered by CES exhibitors: **1,006,280 square feet**

Floor space at CES covered by interactive entertainment industry: **171,902 square feet**

Floor space covered by Nintendo display: **59,427 square feet**

Floor space at the CES covered by Sega display: **37,697 square feet**

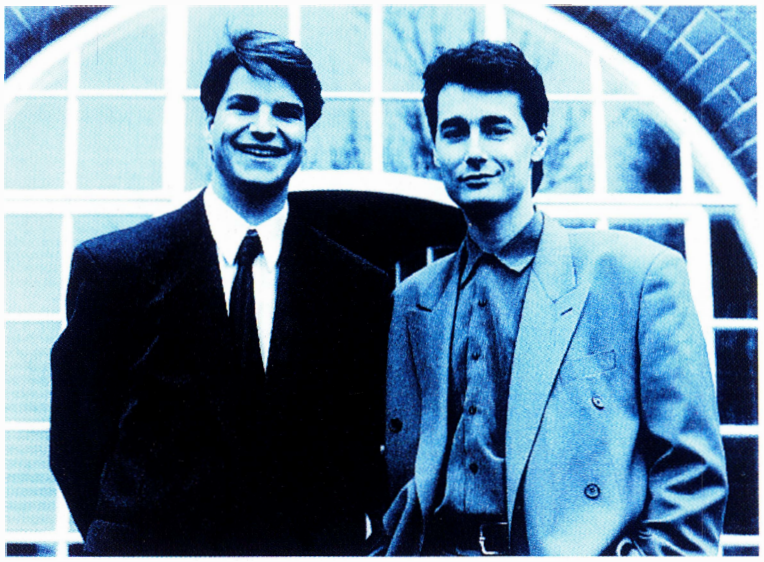
Money invested by Atari founder Nolan Bushnell on the formation of the company in 1972: **$250**

Sum paid to Bushnell by Warner Bros when buying Atari in 1977: **$28 million**

Amount of money lost by Atari for the year ending December 1st 1992: **$73.6 million**

In Japanese, the word Nintendo means: **'Work hard, but in the end it is in God's hands'**

Expected total CD^{32} sales by Jan: **75,000**



R&D director Martin Green (left), and managing director Chris Gibb (right) of Attention To Detail. Their new hardware/software system could revolutionise low-end coin-ops

The *Zool* coin-op boasts an animated intro and new level designs by Gremlin, while ATD recoded the game, adding parallax scrolling in 256 colours

← keeping all processing on-chip. Electronics on-chip are three to 10 times faster than off-chip, and it also reduces the need for lots of external RAM.

'What we have is something that eliminates bus bandwidth as the main way of rendering graphics.' says Martin. 'Traditionally, most games start off by having an empty screen buffer and you paint objects from the back, forwards towards the screen until you've got the image you want. What we have is a method that uses on-chip processing to do the same thing. The actual truth is that there's no screen memory at all.'

According to Martin: 'If you look at the underlying hardware, a programmer would be hard pushed to get a single sprite moving: it doesn't work that way. There's a whole layer of highly optimised software that implements our algorithms and actually does the work.'

ATD are quick to point out that this makes the system very easy to work with: programmers won't have to get to grips with learning the vagaries of new chipsets or operating systems.

The ease

of use, portability and scaleability of the system makes it a target for many new developments. Martin explains: 'We have the first machine up and running *Zool*, and we'll continue to develop increased performance arcade systems, but we're also looking to take the architecture into any other market that it's suitable for. One of the most interesting ideas is to implement a very low-cost version completely in hardware, which would open up all sorts of opportunities in consumer electronics. That might be low-end consoles, high-end arcades or windowing systems on graphic interfaces.

'Obviously we don't want to give too much away,' says Joint MD **Chris Gibb**, 'but we have a technology, and we're looking for applications for that technology in other markets. It has specific advantages which are: ease of development; scalable performance; and a low bus bandwidth requirement.

'In particular we can see strong advantages in low-cost Virtual Reality, hand-held consoles and interactive TV.'

And you can expect to see the first fruits of this new technology in the arcades later this year ...

E

When is...

The 12" LaserDisc format has been around for more than ten years. However, this is the first time that the possibility of playing back video footage from Philips' new Compact Disc format was fully realised...

i wish...

Eric Matthews

'... That an internationally successful, mass market, single machine format emerges that is appropriate to a variety of game styles, with an open publishing approach. I know this is every developer's wish and I also know that it's not going to happen, so here are some more wishes...

2. I wish there would be a ban on the supposed Quality Control approval system adopted by certain manufacturers, which only goes to create safe, formula entertainment and kills creativity and innovation.

3. I wish that hardware manufacturers would communicate with software developers in the form of information (and obviously cash).

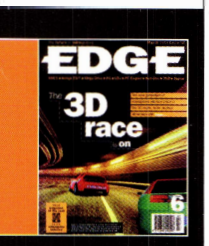
4. I wish that Commodore succeed (you did ask for wishes).

5. I wish there was a button that you could stick on the front of any PC to enable it to automatically detect and configure itself for every game, application and card you install. If this doesn't happen then PCs are out of the running for wish number one.

6. I wish there could be a ban on licensed games, apart from those done at LucasArts – who will be allowed to continue because they know what they are doing.

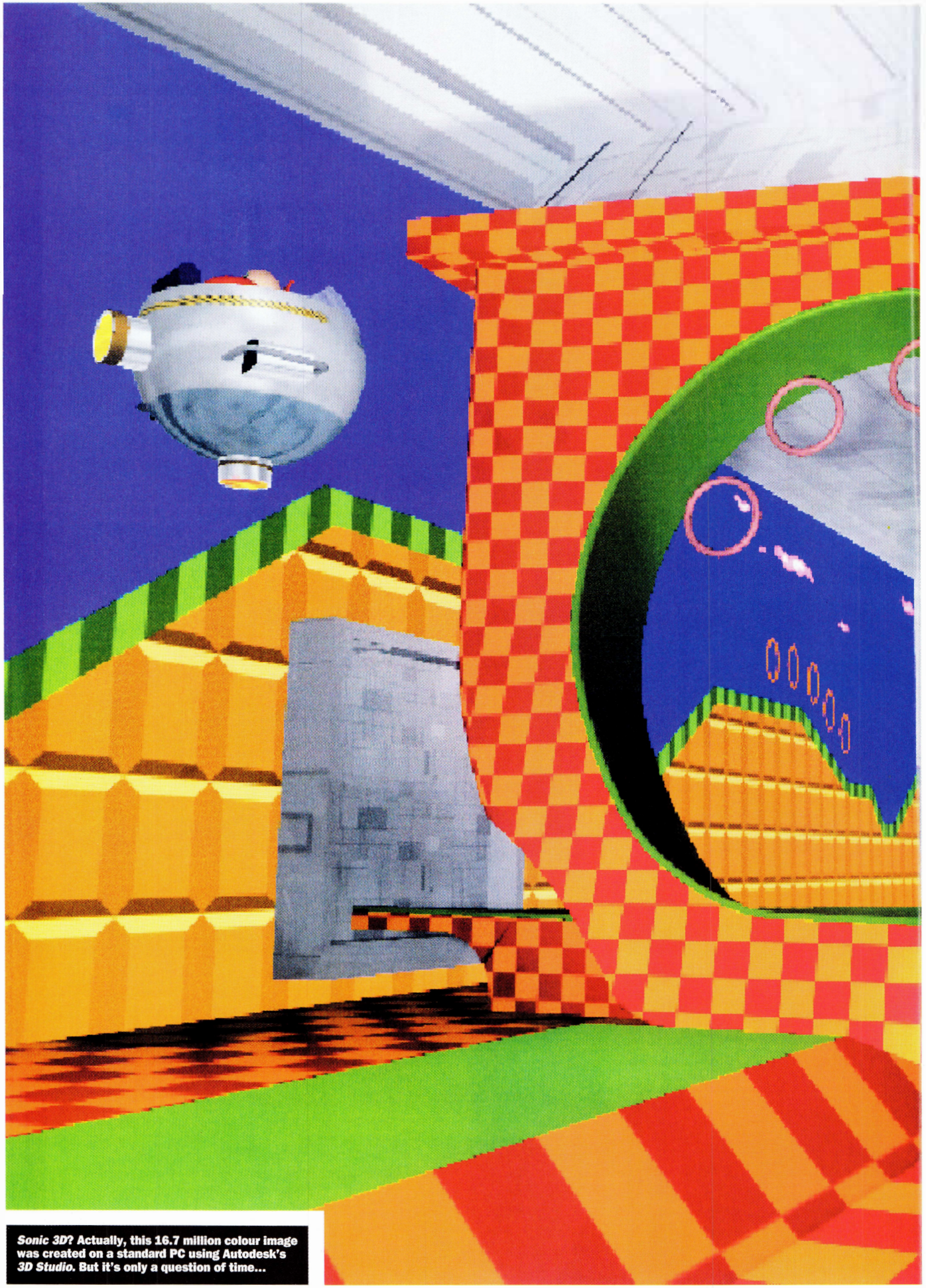
7. I wish I could be given a free copy of *Sam And Max* on CD-ROM. If this wish doesn't come true, LucasArts are banned as well...'

Eric Matthews is director of The Bitmap Brothers – the creators of *Speedball*, *Gods*, *Xenon* & *Xenon II*.



It's clear that realtime 3D graphics will soon push aside prerendered imagery in widespread gaming applications, but what of the technologies and techniques that are enabling the revolution? Here, we look at the mechanics involved in modern 3D game production. And look – can it really be Sonic in 3D?

Image: Marcus Morgan, Courtesy of Virtual Image Ltd



***Sonic 3D*? Actually, this 16.7 million colour image was created on a standard PC using Autodesk's *3D Studio*. But it's only a question of time...**

3D

Games in another dimension

Edge takes a look behind the scenes of the latest 3D images

More and more games, both on home systems and coin-ops, are moving into ultra-realistic 3D settings. Just consider newies like *Ridge Racer*, *Virtua Fighters*, *Total Eclipse* on 3DO, *Doom* on the PC, if you're in any doubt. And the new systems – Sega Saturn, Sony PS-X, Nintendo Project Reality – will all contain dedicated 3D graphics engines. There's no doubting that the next generation of games will take place in the third dimension.

So, **Edge** thought it was time for an analysis of just how these stunning 3D images are brought to our screens. And thankfully you won't need a degree in pure maths to understand how it all works. In fact it's often all just a matter of three simple numbers...

You're probably aware that you can define any point in three-dimensional space by a set of three coordinates: X, Y, and Z – the equivalent of left/right, up/down and forwards/backwards.

3D uses lots of points, defined by three dimensional coordinates, to build objects. For example, define four corners of a square, and you've nailed down the exact position of an imaginary square floating in space.

You probably already know that 3D games are based on polygons. But many people forget that polygons are flat shapes, like squares or discs – not solids, like cubes or spheres. To make up a cube for a 3D game, you'd use six polygons, one for each surface of the cube. That's six polygons, each defined by four sets of three coordinates, just for one simple object.

So to build up the artificial reality of a 3D game world is technically quite straightforward. All you have to do is define sets of coordinates for the objects in the game – planes and buildings in a flight sim, for example – making sure to build all your objects out of flat shapes.

One thing that should immediately

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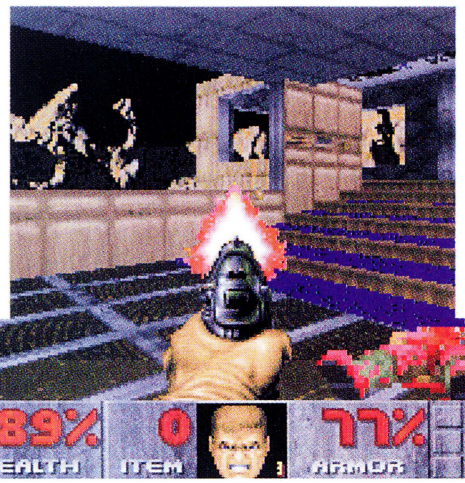
featureview: 3D

The as-yet-unseen *Forgotten Castle* uses full texture-mapping and depth-cueing to astonishing effect



Id Software's *Doom* shows off its 3D engine. Here you can see through three separate windows to the mountain scenery outside. You can even shoot through windows and doorways and make kills in adjacent rooms

***Ultima Underworld 2* again uses depth-cued texture-mapping to turn polygons into corridors**

Solid or filled polygon 3D games as we know them today trace their ancestry back to vector or wireframe 3D arcade games like the classic *Star Wars* machine, which also featured sampled speech and sound effects, and the tank simulator *BattleZone*.

But the game that really put the seal on it was David Braben's *Elite* in 1984. For home computers a new breed of games emerged which, because you didn't have to put coins in, had no limits on time spent playing. Braben combined this with the benefit of 3D methods to create the first believable game world: you literally had a whole galaxy to explore.

For most of us, the first encounter with solid 3D was Geoff Crammond's *Revs* on the BBC in 1985. From then on, and especially as new machines like the Amiga and Atari ST appeared in 1986-7, filled 3D had pride of place as the ultimate in advanced gaming. Braben even got his hands on an early 32bit Archimedes to produce the weird *Zarch*; truly an acquired taste, but lauded by many as the finest game ever created, even in its Amiga/ST incarnation as *Virus*.

While Incentive's explorative adventures using their Freescape system brought 3D to the 8bit masses, during the course of 1988 it was 16bit 3D that remained the coolest in computer gaming. Crammond released *The Sentinel*, Realtime produced *Carrier Command* and Jez San's Argonaut team produced the splendid but shallow *Starglider 2*.

Flight sims were a part of this spearhead, and *Interceptor* (June 1988) is credited with selling more Amigas than Commodore's marketing campaigns ever could.

But slowly, as console platform games took the limelight, the profile of 3D began to slump. The Assembly Line's *Interphase* in November 1989 was still at the sharp end, but by the time the same team's *Cybercon III* was released in March 1991 it was heralding the end of the Amiga's 3D rule.

What was happening was that the top 3D teams were moving on, in search of new goals like true light-source shading, texture-mapping and Gouraud shading, which meant a need for extra processing power. Already the experts were saying that before long we'd have consoles

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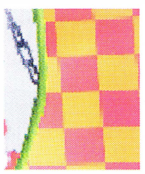


become obvious is that nice, curvy objects are difficult to model in 3D. For a good, smooth curve you need lots of points, so the smoother a curve you try for, the more points you need. And when it comes to doing anything with your objects later on, all those points will have to be dealt with by your calculations.

And that, simply enough, is why 3D games tend to look blocky, and why they've become more realistic with increasingly powerful machines. Balancing speed against the level of detail is one of the most difficult tasks for a 3D game designer.

To define all these coordinates for your objects, you need a reference point – what you might call 'absolute zero', the coordinate (0,0,0). You might expect this to be somewhere in the gameworld, but in fact it's not. There is no single point that all objects are defined relative to. The polygons for each object are defined relative to its centrepoint, so each object has an extra coordinate. Which means each object is self-sufficient.

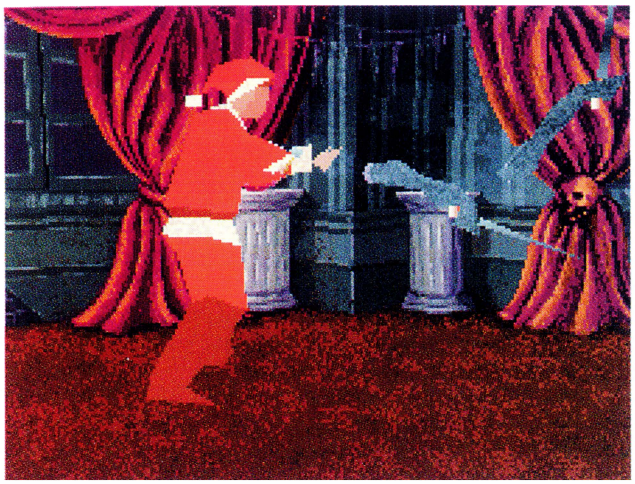
This makes it much simpler to design the objects. They can all be built individually, and thrown into the gameworld as the game builds up. Most of the 3D programming teams have developed their own 'object editors' which they use to build their objects.

Another consequence of this is that the whole of a gameworld is not in existence all the time: just the bits of it that are relevant to the player at any particular point.

This, again, means that you don't have to calculate everything all the time and so it

***The 7th Guest* is one of those games that cheats. All the 3D graphics are rendered a frame at a time on PCs running *3D Studio*. The linked frames are then merely displayed during play**

A polygonised officer Murphy struts his stuff in Ocean's odd, but well-received, *Robocop III*



Taking the opposite route to the *Underworld* games is *Alone In The Dark* and its sequel (above). Here, scenery is predrawn and the characters are represented by polygons. The animation is surprisingly fluid and realistic

***Out Of This World* is a sort of flat *Alone In The Dark*, using 2D polygons to animate its characters**

with built-in hardware for drawing 3D, but in the meantime the PC would be where it was at.

Back in 1991 Electronic Arts were at the forefront with their *Chuck Yeager* flight sim, where texture-mapped detail provided realistic fields and hedges to rush past underneath your plane. Texture-mapping was taken to its logical, and jaw-dropping extreme with *Ultima Underworld*. Underground dungeons were presented using polygon technology, and full depth-cued texture-mapping completed the illusion.

As texture-mapping became more and more commonplace, 3D designers turned their attention to the problems of Gouraud shading.

In 1992, Microprose's *Harrier Jump Jet* had arguably the first successful use of Henri Gouraud's algorithms. *Reach For The Skies* followed, using Gouraud shading on the planes.

PC simulations have remained at the forefront of 3D, and the latest titles, such as Novologic's *Comanche*, and Cyberdreams' *CyberRace* have introduced gamers to the concept of 3D pixels, or 'Voxels' which can be viewed onscreen from any angle.

But recently some of the big names in 3D have taken refuge in the past: while Braben worked painstakingly for several years on *Frontier: Elite II*, Crammond said goodbye to the Amiga with the astonishing *Formula One Grand Prix*, a *Revs* for the 90s.

Argonaut, meanwhile, decided that they would come up with their own solution to hardware limitations and cooperated with Nintendo to create the chip which runs *StarFox*, the most advanced example of 3D you're likely to see on the Super NES.

At the moment, the revenge of the arcades is under way. With the exception of Atari's *Hard Drivin'* – a huge arcade hit in 1990 – and Microprose's own *Strike Eagle*, coin-op machines have done little for the 3D cause. But the latest generation of machines from Namco, Sega and even Konami now generate superb texture-mapped complex images, generated real-time at extremely high speeds. And technology as powerful – if not more so – will be in the home by the end of the year.

Sony's PS-X technology is already being licensed for use in coin-ops – it's *that* powerful. And Nintendo have also nailed their flag to the 3D mast with their →

Sega's *Virtua Fighters* doesn't do anything cleverer than *AITD*. What it does do, though, is generate more polygons, faster. And with beat 'em ups, speed – and response – is of the essence

speeds up the game.

Right. So our object appears in the gameworld when it is required, and not before, according to where the player is in the game. Its centrepoint is defined by a set of coordinates relative to the player, and its shape is defined by coordinates relative to the centrepoint.

The unit of time in a 3D game, just as in a bitmap game, is the frame rate: every time the screen is drawn. Bitmap games nowadays tend to aim for a frame rate of 50 frames every second, but 3D games get away with a much lower rate than this; 12 is quite normal, but often as little as eight is perfectly acceptable.

Because there is so much to do in between each frame, with shape-heavy scenes the polygon drawing can slow down the frame rate unacceptably. And as in any other game, the functions of movement of objects and collision detection must be handled between each frame draw.

Collision detection is essentially the same as in any other game – a comparison of the coordinates of all the objects, to see if any are overlapping. The danger is of having too many checks to do. If you have only 20 objects in a game, that's 400 checks to be done, so the game designer has to find ways of checking only the ones that really matter. There's no way of short-cutting collision checks mathematically: you just have to design around the problem.

Movement of

a 3D object is simple; the movement pattern is defined as a vector which is simply added on to the coordinates that define the position of the object's centrepoint relative to the player.

Naturally, it's also possible to create a complex pattern, like an object that goes

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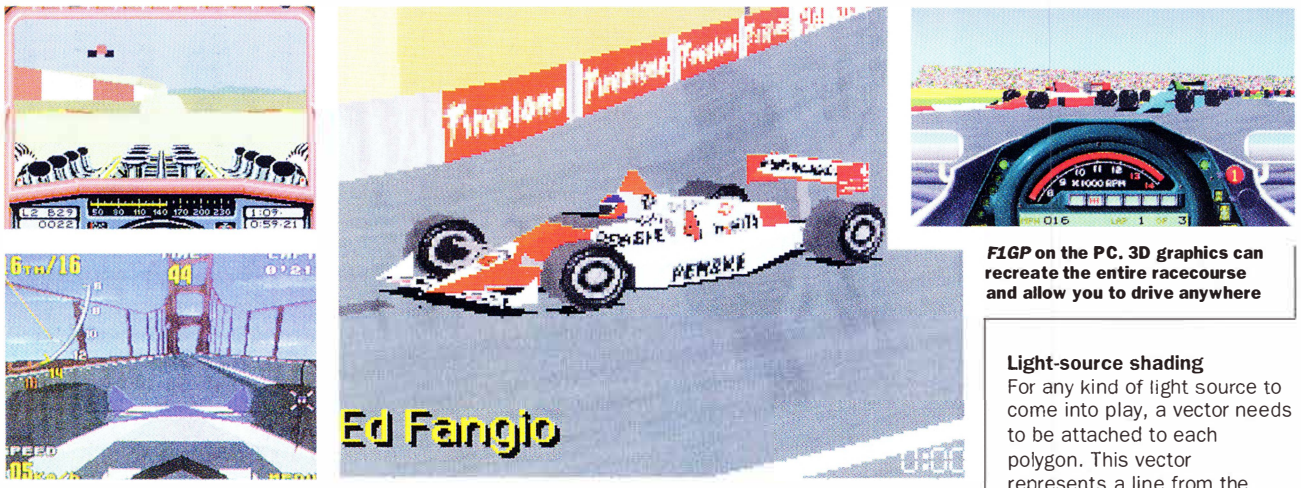
featureview: 3D



Racing games are a prime target for 3D, as there is almost no other way of effectively showing the action. One influential game was *Stunt Car Racer* (top left): basic graphics but an overwhelming sensation of movement. *Virtua Racing* (above left) and *IndyCar Racing* (above) both use 3D to view the race from a variety of angles

***F1GP* on the PC. 3D graphics can recreate the entire racecourse and allow you to drive anywhere**

recent agreement with Silicon Graphics – *the* leading edge in computer generated imagery. A 64bit system based on SGI's proprietary chipsets should be mindblowing.

To prepare you for the 3D onslaught, what follows is an explanation of many of the technical terms that do little but cause confusion...

Imitation light source
Generally in a game, all the objects tend to stay the same way up. This means that if you wish to give them the appearance of being shaded as if the light source was directly overhead, all you have to do is make sure when you design the colouring of your object, you make the panels on the underside a darker shade than those on the top.

Shadows
Shadows on the whole are simply not bothered with, but where they are implemented, the way of doing it is usually to simply create a dark object from a few polygons. You then move it the same way as the object, though constraining it in the Y (vertical) axis to a single plane, that of the gameworld's 'floor'.

You can also do calculations based on dividing by the Y coordinate of the object that the shadow is of, so that as the object rises, the shadow gets smaller.

Light-source shading
For any kind of light source to come into play, a vector needs to be attached to each polygon. This vector represents a line from the centre of the polygon at right angles to the plane of the polygon, and is called the 'surface normal'.

The vector for each polygon is compared with a vector that represents the direction of the light (called the 'angle of incidence'), and the colour of the polygon is modified accordingly. Generally, only three or four different shades of the base colour need to be used for a whole object.

Gouraud shading
Named after its inventor, Henri Gouraud, this type of shading has the advantage that it

Continued

round in circles, by simply modifying the movement vector for each new frame you create.

Movement for the player is only slightly more complicated. The player's input with the mouse or joystick is converted to a vector for movement – this is made a good deal simpler by the fact that it's likely to be in only one axis only.

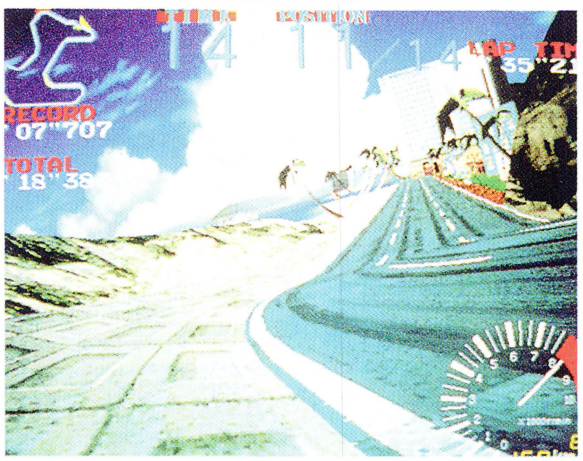
Since the movement is relative to the objects in the game world, this vector must then be applied to all the objects to make it a movement relative to the player. But naturally, what's applied to the object is the exact opposite of the player's vector.

In other words, if the player moves two steps closer to an object in the X direction, that is the same as taking two away from the X value stored for the object's centrepoint relative to the player.

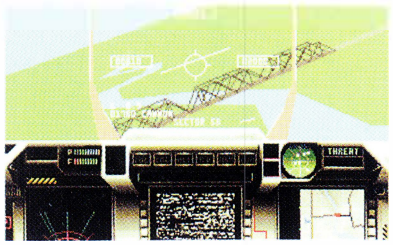
There is, however, another kind of movement to be dealt with. It's possible for the player to change his viewpoint relative to the gameworld without actually moving his position: by rotating.

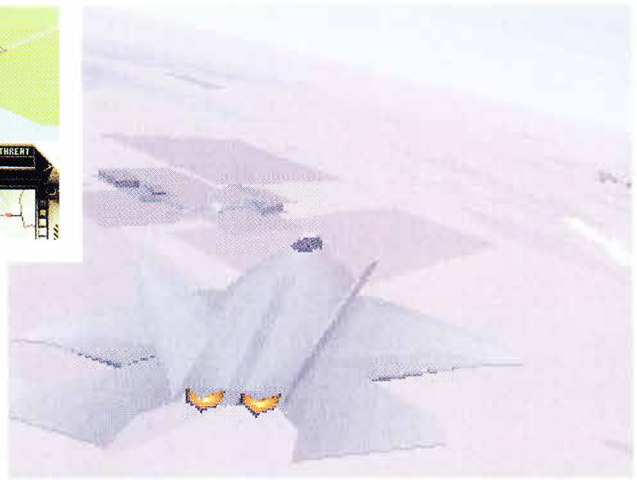
The way it's done is actually simple enough, with all the objects rotated by the opposite of the player's rotation: it's just that a rotation calculation is slightly more complex, because it involves subtracting from one axis as you add on to another.

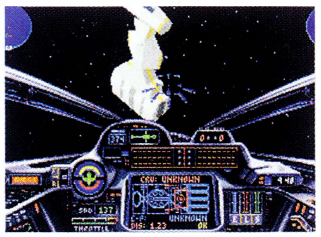
Finally, one last aspect of movement. It's possible that as an object moves, you may require it to change its orientation relative to the player. An enemy airplane, for instance, might bank, tilting sideways, and turn away as it flies away from the player. Changing the orientation means you have to alter the coordinates of all the polygons in an object relative to the centrepoint of the object, so

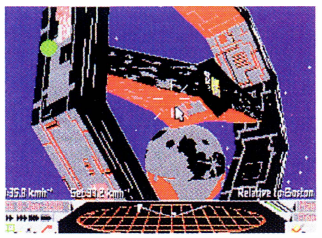


***Ridge Racer*'s astonishing roadways are made up of texture-mapped polygons. Namco's System 22 hardware represents the state-of-the-art in 3D coin-op technology – for the present...**









***F-29 Retaliator* is a classic example of balancing object detail against frame rate**

Air and space combat simulations profit from the freedom of movement that 3D graphics can impart. *TFX* (above) manages to maintain a high frame rate, even with complex, Gouraud-shaded craft. Combat in space – as with *X-Wing* (top right) and *Elite* (above right) – benefit from having no ground to render

appears to smooth off the corners of rounded objects. However, it takes a lot of processing and so has only become possible over the last couple of years on fast PC systems, and is mainly only used in flight sims.

It works like this: the usual surface normals for the polygons are taken; then 'vertex normals' are calculated by taking the average of the surface normals. These vertex normals are then given a shading value by comparing them to the angle of light, just as the surface normals are in standard flat shading.

Phong shading

Named after its inventor, Phong Bui-Tuong, this method is more realistic for doing curved surfaces like spheres than Gouraud shading is, because instead of shading each polygon in straight lines, it shades them in curves.

It is, however, a good deal more complex and extremely costly in terms of processor time, because it calculates extra 'normals' for every single one of the pixels on a polygon, so it's not yet been used in real-time games.

Raytracing

Some day, as you search the skies for the MiG fighter you know is lurking there, you'll be able to catch the brief flash of light as its wing reflects the light of the sun.

Full raytracing requires far too much processing power to be plausible as a real-time operation – but we can dream.

It works like this: every object's surface is assigned not only a colour but also a value for how well it reflects light. The software then traces back beams of light, starting from the surface normal of every pixel of the last object the light hits, seeing what other objects the light bounces off on the way.

Each of the pixels the ray hits along the way has its colour modified according to how reflective it is, and what the colour of the previous pixel the light ray hit was.

True texture-mapping

Currently the preserve of advanced 3D modelling

→

***Comanche: Maximum Overkill* is just that. The graphics – using Voxel technology to create the undulating scenery – are an astounding testament to the ingenuity of 3D programmers**

though it's simple enough in concept, it does add a lot of extra calculation.

But once you can handle the movement of all the objects, you can start drawing the screen display.

As we've said, the polygons in the object are defined relative to the centrepoint, and these are held in a matrix. First task is to relate the polygon to the player's position. Next comes the perspective calculation, which turns the 3D X, Y and Z coordinates into 2D X and Y coordinates. This sounds like it ought to be terrifyingly complex but is in fact quite simple.

For each vertex, the 2D X coord will be the 3D X multiplied by a constant (a set figure, put in to make the result more manageable) divided by Z; and the 2D Y coord will be the 3D Y multiplied by another constant divided by Z. Think about this: all you're really saying is that the further away something is (therefore the greater the Z coordinate), the smaller the end result will be. Objects appear smaller as they get further away.

You have to multiply by a constant to make the figures more manageable and you also have to add on the centrepoint of the screen but that's all there is to it.

What we're left with now is a set of 2D coordinates defining the shapes of the polygons as you actually see them. So what was previously defined as a square at an angle to you, now becomes whatever it will look like onscreen.

What follows, before we can finally get our screen display, is the most complicated piece of programming in any 3D game. And although you might have thought all that handling of complex 3D objects would be pretty expensive in terms of processor time, it's the remaining bit of the work that still takes up most of the

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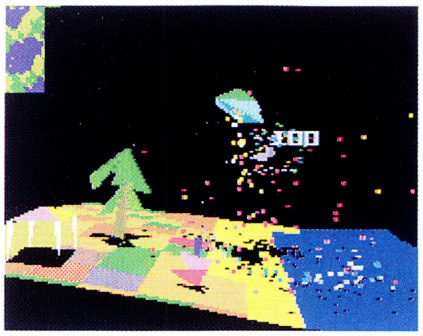
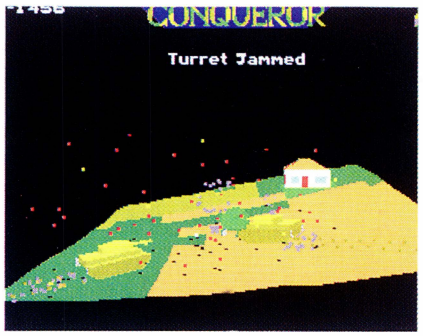
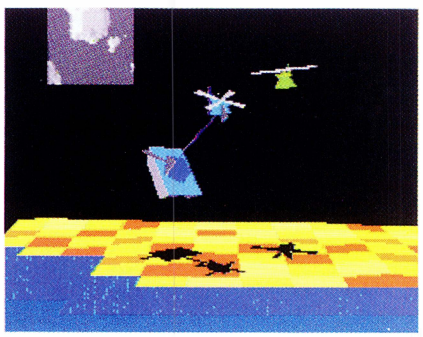
featureview: 3D



David Braben's classic *Virus* uses the 'tabletop' landscape system, which keeps the player's ship central and slides the land around beneath



The same graphics engine was then used to good effect in *Conqueror*. Here, the player takes control of a battletank



And now the best of both worlds has been incorporated into *Zeewolf*. Binary Asylum's 3D engine is faster and more colourful

packages like *3D Studio*, this was the technique used to create the robot models in *Rise Of The Robots*.

A bitmap screen painting can be wrapped on to the surface of a 3D model, thereby adding extraordinary levels of colour detail, and can then be rendered using raytracing techniques.

Scaling as imitation texture-mapping

True texture-mapping requires that every single pixel on the surface of a polygon must be rotated individually, so it takes a truly enormous quantity of processing – far too much to actually do in real-time.

Within the last couple of years, games have appeared – particularly adventures like *Wolfenstein 3D* on the SNES – which use a kind of texture-mapping to build the scenery. In actual fact, this method can only be used to detail, say, the walls of a dungeon – not the floors, nor the ceilings, and not more complex objects. That's because the scenery is made up of blocks of bitmaps which are scaled to make it appear as a 3D plane.

Polygons as imitation texture-mapping

If your 3D routines are efficient enough, and you have enough processing power, when you want to put details on an object you can simply do it by using extra polygons. This is often used for details on airplanes in flight sims, or cars in a driving sim. It's a lot more efficient than true texture-mapping because even if you double the amount of objects on your screen, you still don't have to calculate every pixel of every polygon.

This is also the technique used by the most advanced recent Sega arcade games which haven't cracked the art of texture-mapping.

Bitmaps as 3D objects

It is possible quite easily (and there are graphics programs on the market that do it) to convert a bitmap to a 3D object which can then be treated as any other object in a game. So it is that quite strange objects that look almost exactly like texture maps are included.

Depth-cueing

An extra tinge of realism can be added by making objects darken as they appear to be further away. When an object first appears in the distance, it is very often represented by a much simpler set of polygons, because drawing the whole complex object would still only result in a few tiny pixels and would take much more

Continued

time in 3D videogames.

First you have to handle a process called 'sorting' (or backplane removal), which involves working out which of the faces of an object you can actually see. If your object is a cube, for example, you will only ever be able to see three of its six faces: the polygons at the back are hidden.

The simplest way of sorting involves defining all the points in a polygon in a clockwise order. If, after the polygon is converted to 2D, all the points are still going clockwise, then it has its face forwards and needs to be drawn. If the points are now going anticlockwise, the polygon has its back to you so does not need to be drawn.

There are, however, problems at other stages of the process, and so this simple technique is rarely used: more complex techniques tend to remain trade secrets. Worse still, sorting is simple enough if your object is convex, like our cube, but is vastly more complicated if your object is concave or if it has holes in. No-one used to use convex objects, but some of the top 3D teams came up with clever ways of dealing with them.

Similar to sorting is the next process, where you have to decide which of the many objects in your field of view actually get drawn on the screen. Obviously, some will be closer to you and will hide or overlap the ones that are further away.

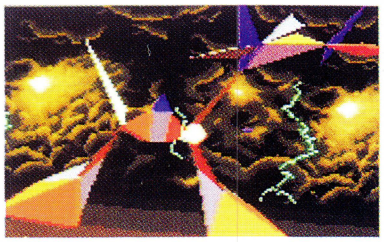
At this stage a piece of code sometimes known as a 'painter algorithm' comes into play: it's so called because it draws the objects that are furthest away first, then paints over them with the nearer ones. All this is done in the screen buffer before the screen is actually displayed.

One such technique, which also covers sorting, is called 'Z-buffering', where a separate memory buffer is used to store all the Z values of the polygons as they are converted to 2D, and each pixel is then checked to see if there are other pixels that share its X and Y values before the one with the lowest Z value is drawn.

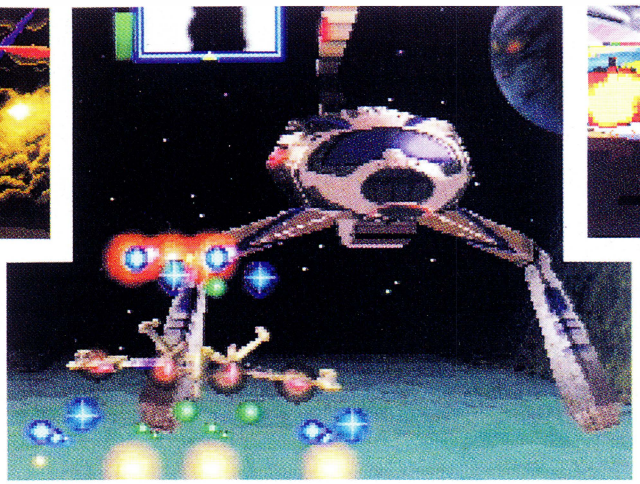
If a polygon is too big to fit on the screen, and disappears off the side, top or bottom, it has to be cut down to fit the screen. At the end, if a simple four-cornered shape goes off the top and the side, you might end up with a new polygon that has six corners.

The simplest way to cut it down is with a technique known as clipping. You simply feed each polygon through a number of steps that cut off the top, sides and bottom – though most people use more advanced techniques.

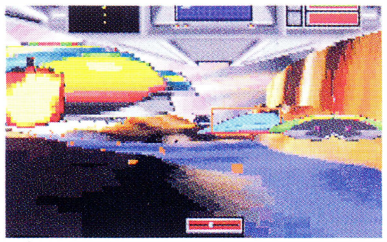
Some programming teams use sophisticated drawing routines that are capable of leaving out the clipping of the X axis altogether, making sure that each horizontal line of the screen display starts and stops drawing polygons where it should, but ignoring whatever part of them



The Super FX chip dragged Nintendo into the 3D age: *StarFox* also features bitmap backgrounds



Total Eclipse **is a good example of games played 'on the rails', where the player's movements are restricted. They're simpler to code, since you don't continually have to keep track of every object in the gameworld**



The futuristic *CyberRace* – like *Comanche* – uses Voxels to generate its stunning scenery

calculation. By the same token, using the Z coordinate as a key, the object can be made several shades darker in colour – which, in a similar way to atmospheric perspective, adds the impression of distance.

Atmospheric perspective

A technique similar to that used by artists, who know that the nearer the horizon an object is in daytime, the paler it appears. Objects can be shaded lighter when they first appear in the distance, using the Z axis as a key, but it's also common nowadays to shade the sky, and very often also the scenery, in flight sims so that they pale towards the horizon. This is a simple raster-line function that shades the solid colour of the sky or floor, and so requires no 3D work at all: it's just the same as simple shading in a bitmap game.

Fractal mapping

Fractals are often used to generate landscapes, but seldom in real-time, though the technique is beginning to appear. Fractal landscapes are built out of triangular polygons, in roughly the following fashion. Imagine you have a triangular piece of paper and draw three lines that meet at the centrepoint of the triangle. Now imagine your paper is infinitely mouldable, and that you raise the centrepoint to a specified height: then repeat the operation on the three triangles that now form the sides of a pyramid, raising their centrepoints to slightly below the height of the first: and so on, repeating the process as many times as necessary to get the required level of detail. The advantage of fractals is that as the player gets closer, a new level of detail can be calculated in real-time, so that objects appear to get more detailed.

Bitmap objects in 3D

An increasingly popular idea is to use bitmap images for the objects on a 3D surface. Because the objects have a 3D position, they can be scaled in relation to their Z axis: but because they are not genuinely 3D themselves, you cannot 'walk round them' and see a different side of them from any angle.

The advantage is that such bitmap objects need no calculation beyond the sizing, and that they can be as detailed as you like without the need for texture-mapping calculations.

Cybermorph **makes full use of the Jaguar's built-in Z-buffering, which allows 3D objects to be easily displayed in relation to one another – sitting on top of or even intersecting other polygons**

appears above or below the screen.

The last piece in the jigsaw – and by far the most important – is the polygon filler. This simply runs along each horizontal line of the screen display in turn, drawing in each pixel of every polygon and working its way down the screen. The polygon filler is the most complex and time-consuming of all, and it's when custom polygon fillers appear in hardware that 3D systems will really come into their own.

Having carefully avoided it up until now, we've got one final complication to mention: and that's what's known as 'Z-clipping'. The problem occurs back at the 3D stage, when you have an object partly in front of the screen and partly behind it. You can see some, but not all of it. A few of its Z values will be positive and some will be negative, and that causes all kinds of problems if you just throw it into the perspective calculations.

What you have to do, therefore, is clip it as a three-dimensional object, lopping off the bit that's sticking out of the screen and producing a new 3D polygon that has only positive values and can safely be passed to the perspective calculation. It's tricky to do well, and still an area for some hard thinking by 3D teams.

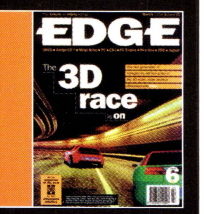
And that, in a nutshell, is all there is to it. Hopefully we've gone some way to demystifying the black arts of 3D.

Of course, the actual application of these techniques is up to individual programming teams – and there will always be variable quality 3D games out there.

But whatever happens, and whichever new machine we finally end up playing on, 3D looks certain to be the language of the future.

EDGE magazine March 1994

Night Trap



Having been responsible for generating more interest in Sega's Mega CD add-on than any other title, Digital Pictures' shocker makes it to 3DO. The full horror of SCAT members, neck trusses and screaming girls can now be enjoyed at a better resolution, with more colours, and gameplay enough to earn a 5/10 score.

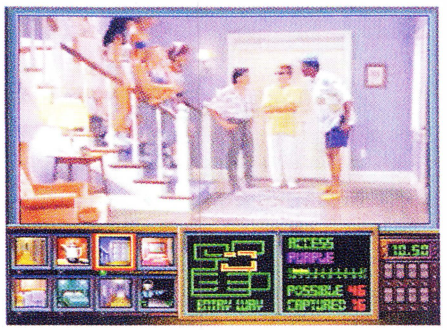
Format:	3DO
Publisher:	Virgin
Developer:	Digital Pictures
Price:	£50 (import)
Size:	2 CDs
Release:	Out now (US)

Digital Pictures had considerable success with *Night Trap* on the Mega CD, mainly due to its adverse publicity. They're now hoping to emulate that success on the 3DO.

Many would argue that the 3DO system deserves original titles, not just hand-me-downs, and after spending several hours playing, sorry, interacting with *Night Trap*, **Edge** is inclined to agree.

A group of five teenagers disappeared after spending the night as invited guests at the house of Mr and Mrs Victor Martin. The Martins claim that the teenagers left their home on Sunday night, but after thorough investigation the police have failed to turn up any evidence of their whereabouts. The case is then turned over to a Special Control Attack Team, SCAT for short, and that's where you come in.

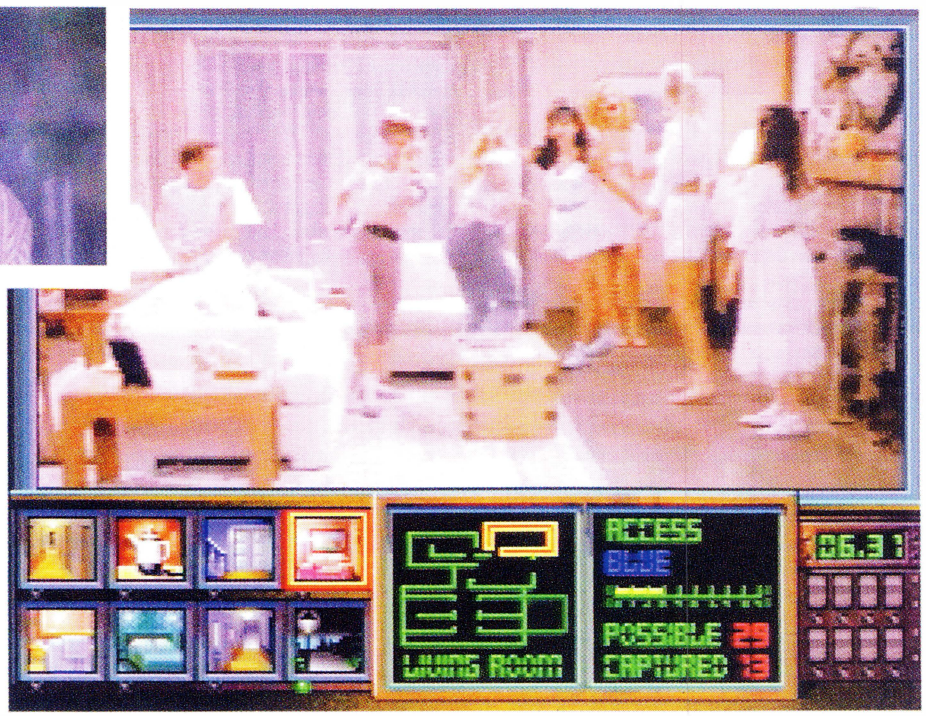
Using an elaborate security system, containing surveillance cameras and carefully situated booby traps, you're sent in to investigate. It soon becomes apparent that the teenagers didn't just disappear – they were abducted, and by a band of evil Orgs.



Listen in carefully to all the conversations, they offer advice as well as amusement

Five more teenagers are on their way to the house but this time, unknown to anyone else, one of them is a SCAT member. You have to save and protect all the teenagers by switching from camera to camera and capturing the Orgs in the traps situated

A shattered American dream? One minute the star of a popular sitcom, and the next...



Whilst the Orgs run rampant, the kids party on down: *Night Trap* is full of these distractions. Even though you have eight surveillance cameras at your disposal, keeping track of all the events is still quite tricky

The Orgs may look harmless, but after you see scenes like this (left) and (above) you begin to realise otherwise. (You could die laughing)

around the house.

Aside from the improved graphics and presentation, there's little else to suggest this is a superior version. The plot remains the same, the actors haven't changed (Kimberley from Diff'rent Strokes is still there), and the Orgs still walk around the house as though they have a severe spinal problem – only it seems even more amusing this time round due to the clarity of the graphics.

In an attempt to heighten your interest, the trap controls are protected with an access code – in the form of six colour variations – and the correct access code must be entered in order for the traps to work. But there's not much more to it. The game soon becomes dull once you discover when and where an Org will appear, all you're left with doing is pressing a button at the right time to set off the trap.

Night Trap does have an intense atmosphere and has converted quite well, but it's just that it's, well, *Night Trap*. With the limitations of the CD it was never a brilliant game on Sega's machine, and sadly the same can be said of this 3DO version.

Early adopters of the 3DO system will no doubt state loudly that this is a great game, but beneath the enthusiastic exterior there will probably lie a very worried and unconvinced individual. The wait for a really decent FMV game continues...

Edge rating: **Five/** 10

The violence

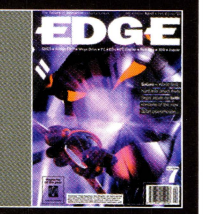
Night Trap couldn't have made a bigger impact when it was first released on the Mega CD. It wasn't because the game was so good, it was because it was one of the first games to receive a British Board of Film Classification rating and no one under 15 years of age could play it. Of course, kids of all ages wanted to know what all the fuss was about, and so sent their parents out to buy the game for them. Children all around the country crept into their bedrooms, loaded up *Night Trap* and eagerly awaited something really awful to happen, and it never did. Apart from the two scenes shown opposite, there's very little to separate this from any other interactive movie/game. In fact, after playing *Night Trap* children did indeed scream, but with laughter not fear

Mega Drive

Trapping an Org couldn't be simpler: wait for your 'Trapomiter' to register full, then simply press your button. The traps themselves vary depending on which room you're in (above), but they all have the same effect

The Orgs prepare themselves for their first victim. The nasty looking contraption is a kind of neck truss with which they secure their victims

EDGE magazine April 1994



Criterion's exciting new RenderWare suite promises to transform all manner of applications, providing 3D interfaces for spreadsheets, interactive home shopping systems, and more. Mostly, though, it'll probably be used for games. And games that'll be photorealistic by the year 1997, too...

A **new** reality... RenderWare

***RenderWare* is a revolutionary new software solution for graphics – 3D may never be the same again...**

it is ...

Pioneer's Digital Design Centre research facility in Bristol. Engineers there have designed a Digital Video system three times faster than the standard MPEG, using high-density CDs. **(See page 44)**

HardWare

***RenderWare* really flies, even on the minimum PC configuration – a 386SX with 4Mb RAM running *Windows 3.1*.**

Of course, it gets progressively better as you unleash it on faster CPUs – on a 486DX running at 50MHz, for instance, typical performance at the application level is 40,000 polygons a second.

That figure was worked out using a 4K polygon model, transformed, lit, clipped, painted, and software double-buffered to the screen in a 400x400 viewport.

Feed *RenderWare* into a Pentium and you can expect 100,000 polygons per second, and half as much again performance-wise on a PowerPC.

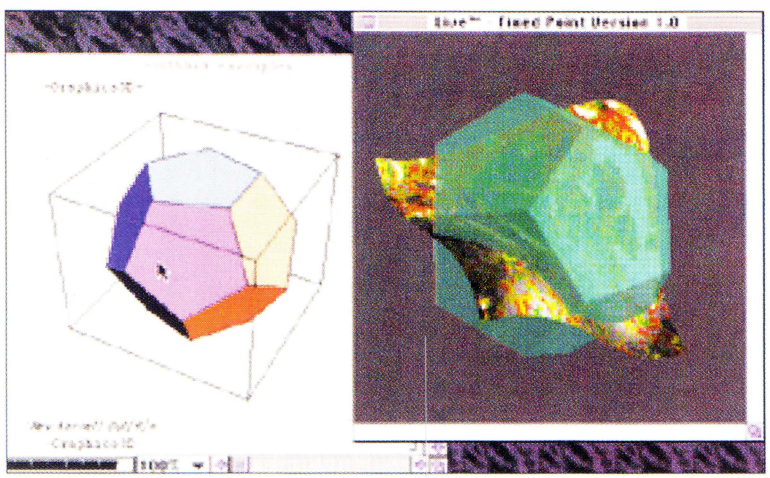
Virtual reality just got a whole lot more real. Developers working on programs for a host of applications – multimedia, home shopping, games, scientific visualisation, training – are about to get wind of a software-only system that delivers powerful, real-world 3D modelling. On ordinary computers.

Soon you'll be viewing the kind of 3D modelling that, until now, you wouldn't have been able to get close to without spending a fortune on dedicated hardware. Sure, if you own a £150,000 dedicated machine you can run a remarkably realistic flight sim. If you have a justifiable need, a £15,000 workstation can deliver the goods. If you are really pushed for cash, you could get away with spending as little as £6,000 on hardware to get passable real-world 3D modelling. A few weeks ago, all that changed.

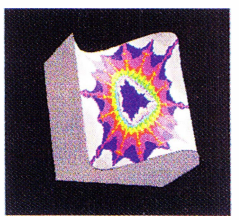
Criterion Software, a UK subsidiary of the multi-billion Canon Inc, have just announced, to general disbelief, a software solution to the problem of realtime 3D modelling. It's called *RenderWare*. Hard-nosed PC and IT correspondents at the launch couldn't believe that what they were seeing was being generated in realtime on a 486 portable PC. One journalist was only convinced that *RenderWare* was for real when he saw the endorsement from Paul Allen, co-founder of Microsoft.

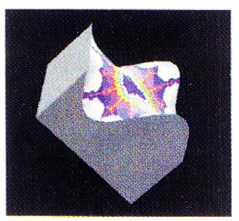
And there'll be tears before bedtime in some quarters as the news filters out – Byte magazine half-jokingly predicted suicides amongst one VR team that was just coming to the end of a six-figure spend on a hardware solution to the same problem: displaying 3D graphics with a convincing real-world feel.

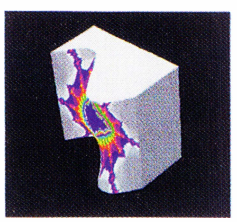
RenderWare really has to be seen to be believed. After the shock of seeing 40,000 polygons a second generated in realtime on an unenhanced 486 sinks in, you begin to get a grip on the potential. A new generation of software is around the corner: games that don't restrict you to a single head position; interactive multimedia programmes that let you explore your environment; 3D →



The first practical application of *RenderWare* is *Live* from Oxford-based True-D Software. Run in conjunction with Wolfram Research's *Mathematica*, it enables the user to visualise and manipulate complex mathematical formulae in realtime







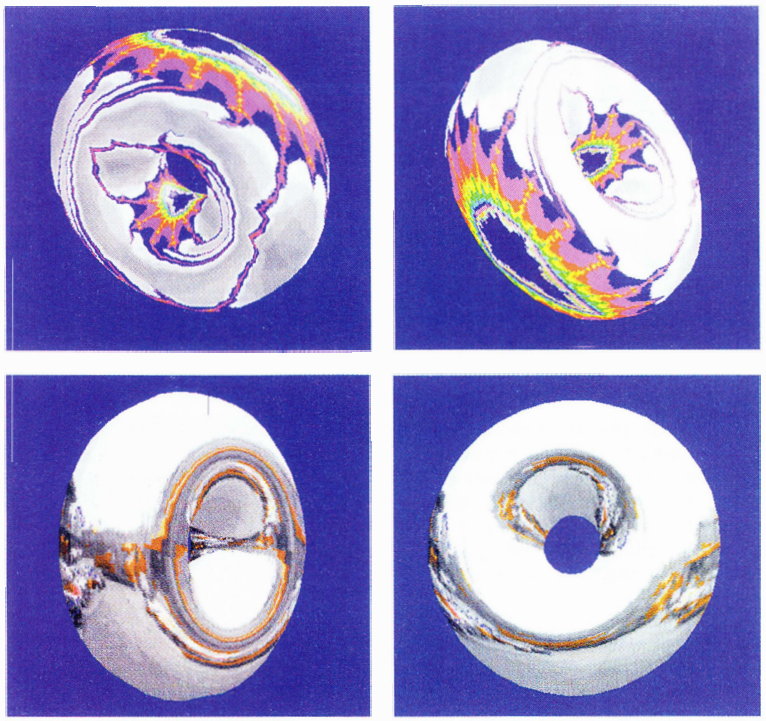
This sculptured block is a visual representation of a mathematical sine function. A Mandelbrot image is texture-mapped on top and the whole thing can be manipulated realtime, via the mouse. Running under *Windows*, this demonstration of *RenderWare*'s power is impressive, but a more complex, fullscreen image would have been even more convincing

SoftWare

Despite the low set-up cost, games developers are likely to adopt *RenderWare* a little more slowly than software houses working on high-end applications.

Criterion are involved in ongoing discussions with games developers, however. You can confidently expect to see *RenderWare*-enhanced games within a year – on the PC and Mac, at the very least. The first product, already in development for Virgin Interactive, is said to be 'pushing the boundaries of what's possible in multimedia entertainment.' Hex (*e-Scape* on CD-i) are developing an audiovisual experience which draws on the video and sound in the Virgin Music portfolio. There is a game element, but in the sense of exploration.

Make no mistake, this is exciting technology. Within three years, interactive photorealistic graphics could be within the grasp of the *RenderWare* system. Adam Billyard, Criterion's Technical Director, asserts: 'I have every confidence in *RenderWare* providing graphics that are indistinguishable from photographs. I can't see why it can't be done.'



A torus is clothed with the Mandelbrot image; but *RenderWare* can just as easily make it reflect its surroundings, with no reduction in speed – even on a 386 PC

The *RenderWare* teleshopping demo allows you to visit a 3D mall: you can walk around objects, turn them and access their prices. Britain could soon be a nation of virtual shopkeepers

interfaces to applications such as spreadsheets; home shopping systems that allow you to interact with the products on offer; and training packages that can model a product which is not in full production.

Currently, there are around half a million 3D workstations in the world. *RenderWare* brings their capabilities to millions of PCs and will almost certainly be running on the next generation of dedicated games consoles. What's more, game and application developers won't need dedicated 3D programmers to bring this new realism to their products (at the moment, there simply aren't enough good 3D programmers to go round). *RenderWare* is easy for non-3D specialists to get to grips with: all you need is C programmers and a grasp of the *RenderWare* scripting language.

What's more, *RenderWare* is processor and hardware independent. Own a *RenderWare*-equipped application and you can take it with you when you buy a machine with a more powerful CPU in the same family – your 3D modelling just gets faster. As the specs of mass-market machines improve, so will *RenderWare* – it works in 24bit colour already and optimises down for 8bit displays. Nor is *RenderWare* operating system-dependent. Although it launched on the Mac, PC and Sun, ports to other platforms will be 'easy', according to its creators. Criterion will expect a royalty on every software unit with *RenderWare* graphics, but that could add less than a dollar or two to the price you pay for a mass-market game – or the publisher might avoid passing on the cost altogether and just trim their profits a tad.

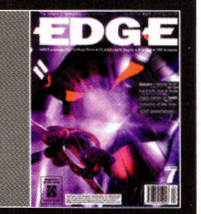
RenderWare is not an application; it's a component, designed to exist within applications. It doesn't take over the machine; in effect it coexists with 2D graphics as a service module, on which the application developer draws. It's well suited to immersive applications ('virtual reality', in other words), so you can interact with objects – wandering around a modelled room, for instance, changing your viewpoint and meddling with things.

And you get all these benefits on a 'standard' machine, with no special hardware. The faster your CPU, the better *RenderWare* performs, but what runs on a Pentium will also run on a 386SX with 4Mb of RAM. Believe it. *RenderWare* will do for 3D graphics modelling what PostScript and ATM did for computer typography and printing. And Criterion promise photo-realism within three years...

Data stream

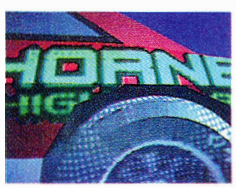
Number of Mega Drives sold in the US in 1993: **5,900,000**
Number of Mega Drives sold in the US from Sept 1 to Dec 31: **3,000,000**
US marketing budget for *Sonic 3*: **$20 million**
Sales of Atari's Jaguar in just two US cities – New York and San Francisco – before Christmas: **27,000**
Estimated US sales of Panasonic's REAL 3DO multiplayer before Christmas: **8,000**
Trendiest T-shirt slogan at the Las Vegas CES: **3DOA**
Company that had them printed: **No-one's telling**
Number of 3DO titles currently available: **18**
Number of 3DO titles expected in 1994: **100**
Predicted total number of videogame carts to be sold in the US in 1994: **112,000,000**
Retail sales of Nintendo hard- and software in the US for the year ending March 31, 1994: **$4,287,000,000**
Estimated value of Nintendo hard- and software sales in the US for year ending March 31, 1996: **$4,915,000,000**
EA's best-selling Mega Drive game ever in Europe: ***FIFA International Soccer***
Sega's share of the total UK software market in December 1993: **18.3%**
Sega's share of the total UK games CD market in December 1993: **36.4%**
CD formats' share of the UK games market in Dec 1993: **2.6%**
Global turnover of Acclaim in one *Mortal Kombat*-inspired quarter: **$127.4 million**
Total value of the UK toy market: **£1.87 billion**
Interactive entertainment's share of the UK toy market: **40.22%**

Daytona



Four selectable viewpoints that are even more exciting than *Virtua Racing*'s? Sega's first Model 2-powered coin-op promises even more than that, delivering 300,000 textured and lit polys per second. But we should expect such excesses from Sega, which for research on its previous game rented an entire Honda NSX.

Sega are right at the leading edge of 3D CG technology. **Edge** brings you the first proper look at what could be *the* racing game of '94



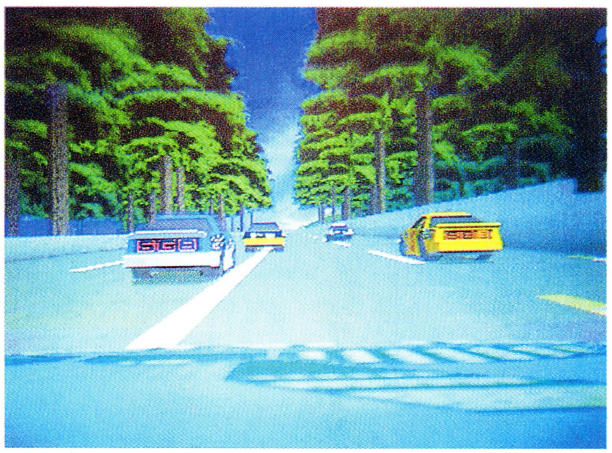
Sega's Model 2 PCB is capable of wonderful texture-mapping effects. This realtime demo painted detail on the cars and backdrops

Format: **Coin-op**
Manufacturer: **Sega**
Developer: **AM2**
Release date: **April/May**
Origin: **Japan**

No-one can deny the impact that Sega's *Virtua Racing* has had in the arcades. Whether it's the amazing four- or eightplayer *Virtua Formula*, complete with 74inch projection screens, the scaled down *Deluxe* version, or the far more affordable basic machine, competitive racing doesn't get much better than this. However, its ongoing commercial success has meant delays for its successor. Only now is the next level being prepared for roll-out *Daytona*, as the name implies, is set on the infamous oval Daytona racetrack in Florida. According to Sega, in order to accurately reproduce the dimensions of the track, information was gathered by satellite, and every last detail of the circuit was then translated into the game. You'd think that an oval track would be a doddle to recreate, but perhaps there's more to it than meets the eye. Besides, it's no secret that Sega take their coin-

The beauty of polygons is that you can zoom right in (top) or sit back and watch from a distance (above)

Although massively impressive, this 5%-complete demo is only a vague indication of the power of Model 2. The finished game will be vastly improved



The number of angles of perspective in *Daytona* seems to be limited only by Sega's imagination. Above is a steep, overhead viewpoint, while top right is its ultra low, ground-hugging counterpart – equally exciting

Of course, hanging out of the car window for the sake of a good view isn't recommended. How about the good old in-car shot (centre), complete with visible bonnet? Or perhaps a back-seat rear view (above)?

The game throws 300,000 texture-mapped polygons around a second – enough to knock anyone's socks off

ops seriously (they actually rented a full-scale Honda NSX racing car for the development of *Virtua Racing*).

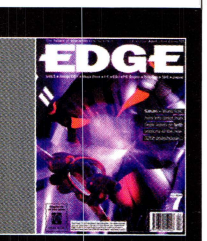
Where *Daytona* leaves *VR* standing is obviously in the quality of the graphics. **Edge** was reliably informed by one of *Daytona*'s Japanese creators that the game, using Sega's Model 2 board, throws 300,000 texture-mapped and shaded polygons around every second. Enough to knock anyone's socks off. For comparison, the more humble Model 1 (as used in *Virtua Racing* and *Virtua Fighters*) handles about 180,000 plain polygons a second.

But what else could our Sega source reveal about the game? Well, like *Virtua Racing*, Sega are moulding *Daytona*'s appeal around the same multiplayer link-up gameplay – up to eight players will be able to compete in the expanded versions of the game. And again, there will be four selectable viewpoints, which have been tweaked to make them even more exciting. Impossible, surely? Not so, according to our Japanese friend.

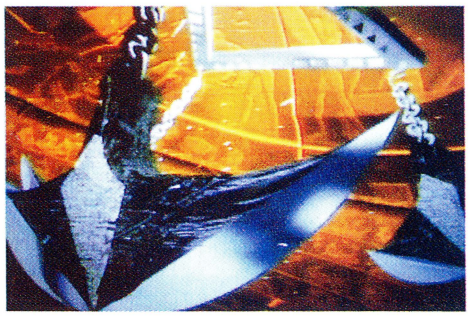
Finally, making allowances for the fact that this early demo was only 5% complete, we wondered if *Daytona* would be able to surpass *Ridge Racer*, our new-found favourite. After a knowing glance at his colleague, our source beamed as if it were the question he'd been waiting for all day. '*We* think so' was the inimitably humble response. See if **Edge** agrees next month.

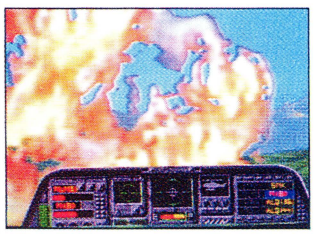
Credits

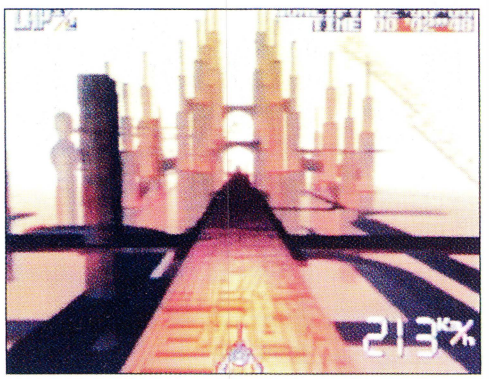
Director: T. Nagushi
Planner (camera): M. Osaki
Planner: Y. Arikawa
Chief Programmer: T. Masuda
Designer: Y. Kawagoshi
Designer: Y. Suzuki
Designer: H. Nakagomi
Designer: T. Kagaya
Programmer: D. Katagiri
Programmer: K. Koiwa
Programmer: H. Miyauchi
Music: T. Mitsuyoshi

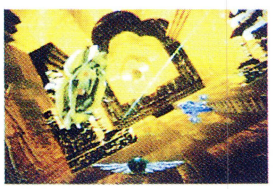


Pioneer's LaserActive system prepares to take on the growing gaming market. Its USPs? LaserDisc media, for starters, but also plug-in options for Mega CD and PC Engine compatibility. With digital video not expected to rival Laser Disc quality for "seven or eight years", how can it possibly not work?









Pioneer's LaserActive system is a marriage of LaserDisc and videogame technology, giving rise to two new game formats: LD-ROM² and Mega-LD

EDGE magazine April 1994

InterActive LaserDisc

Pioneer are hoping to wrap up the home entertainment market with a machine that plays CDs, LaserDiscs, Mega Drive and PC Engine games. **Edge** goes for a spin

The aptly named Pioneer have long been at the spearhead of laser optical technology, having almost single-handedly positioned LaserDisc as a world standard for home video.

The first consumer LaserDisc player was launched around ten years ago in Japan and has slowly but steadily garnered a following among movie and home cinema enthusiasts. Its superior picture quality (60% higher resolution over standard VHS) and digital sound makes it the ideal centre of any home cinema set-up.

With over five million units in Japan, and LaserDisc players installed in around 1% of American homes, the LaserDisc industry is big business – especially for Pioneer. Now, with their LaserActive system, they're turning their attention on the interactive multimedia market.

The LaserActive machine is akin to an FMV-capable CD-i unit; but rather than design and use their own dedicated multimedia technology, Pioneer have struck a deal with Sega and NEC in which plug-in modules give the LaserActive compatibility with

Continued next page

LaserActive

LaserDisc formats

Standard LaserDiscs come in two formats: CLV (Constant Linear Velocity) and CAV (Constant Angular Velocity). The latter already possesses some degree of interactivity in that CAV discs allow you to view every single frame on the disc – all 54,000 of them.

Newer films – the most notable being extended versions of The Abyss and Terminator 2 – have CAV sides which allow you to step through special effects sequences and to read pages of text.

Not only that, but because the disc contains both digital and analogue stereo audio tracks, you can watch a movie clip with different narrative voice-overs on either analogue channel.

Mega Drive and Mega CD titles, and all PC Engine (Turbo Duo in the US) cards and CDs.

Obviously, the scarcity of PC Engine/Turbo Duo titles in the UK means that the PAL LaserActive buyers will only have the Mega Drive module as an option – although there will be Pioneer's karaoke module, which opens up LaserActive to Pioneer's library of some 200 karaoke discs.

The pairing of LaserActive with Sega and NEC modules also gives rise to two new formats: Mega-LD and LD-ROM² games. And it is here that LaserActive hopes to compete with the likes of CD-i, PC CD-ROM and even 3DO.

There is a problem, though, in that it's not a true melding of LaserActive and Mega Drive technology: Sega's hardware provides the 'interactive' graphics – effectively the sprites which the player controls – while the LaserActive supplies the background visuals. The first batch of titles is immediately comparable with CD-ROM games like *Rebel Assault*, *Microcosm* or *Silpheed*, where your craft is 'on the rails': you can move anywhere on screen, but have no control over the direction of your path.

There's also a major drawback in the disparity between the sumptuous LaserActive visuals and the Mega Drive's rather basic graphics. *Pyramid Patrol* is a typical example: the 3D pyramid interiors fly around in glorious, Silicon Graphic resolution, while coarse, blocky aliens and explosions are overlaid on top. It's like having Lamborghini bodywork with a Morris Minor engine.

'History tells us that it tends to be dollars for pounds – how many machines would we sell in the UK at £1,200?'

John Barnford, PR manager, Pioneer UK

The CLD A-100 LaserActive is Pioneer's first multimedia/gaming system. And, if nothing else, it's a damn good LaserDisc player

However, the potential of the system is still enormous: the modular design of the system would conceivably allow any games machine to be emulated, such as 3DO or even Jaguar, providing higher resolution graphics for LD games and also giving access to higher gaming performance than the lacklustre Mega CD. And it would also be a simple matter of producing an MPEG1 cart enabling LaserActive to then play Digital Video movies.

LaserActive is still ideal for educational titles, interactive movies and games like *Mad Dog McCree* and *Dragon's Lair* (both originally coin-op LaserDisc games) which don't rely heavily on support from on-screen graphics. With a point 'n' click interface, all you really need are small icon sprites and a cursor, which even the Mega Drive can handle.

LaserDiscs themselves are an excellent – if slightly bulky – storage medium. A 12cm CD-ROM contains 540Mb of useable digital storage, whereas a 30cm LD-ROM not only contains the same amount of digital storage, but also has room for 30 minutes of analogue CAV (60 mins CLV) film footage with four hours of ADPCM audio. They're also double sided, so one LD-ROM could store two hours of MPEG video plus two hours of CLV video.

So the success of LaserActive really depends on the imagination and skill of the programmers, although the first attempts at LD software – there are over 20 titles now available – have had a lukewarm, if not downright hostile, reception in Japan and the US.

As well as shoot 'em ups – which most of the first Mega-LD games seem to be – LaserActive also has aspirations towards education, multimedia and, ahem, adult entertainment.

Pyramid Patrol (Mega-LD)

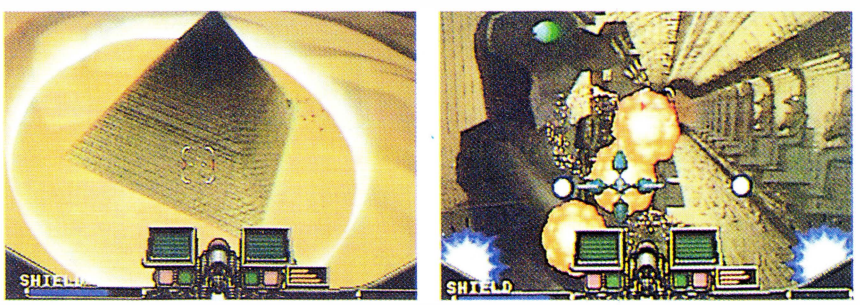
The very first title for LaserActive's Mega-LD format is Taito's *Pyramid Patrol* – an unashamed shoot 'em up in which you pilot a fighter craft through the labyrinthine depths of a colossal enemy-held pyramid.

Like many CD titles, it utilises full-motion video backgrounds, with gunsight, enemy ships and explosion sprites overlaid on top.

Without doubt the scenery is spectacular, with gorgeous rendered pyramid interiors, filled with towering statues, swinging blades, spinning guardians, laser beams and so on. Sadly, the same cannot be said for the Mega Drive graphics, which – even by Mega Drive standards – are pretty crude.

But, more to the point, interaction with the background is minimal, which merely emphasises the incongruous visuals.

The blasting action on offer is quite frenzied, playing like *Microcosm*, but overall, *Pyramid Patrol* is hindered by poor game structure with overlong levels, immensely hard bosses and no passwords or restarts.



Taito's first Mega-LD game is an out and out shooter, played against an alien/Egyptian backdrop. Upon entering the vast Pyramid (left) you're guided through immense rooms and corridors (right)

I Will – The Story Of London is an interactive movie mystery, in which you collect clues and engage in a scenic tour of London at the same time. Sadly, its only outstanding feature is the dreadful acting by the British cast!

The potential for education is explored by *The Great Pyramid*, which describes the last resting place of the Pharaoh Cheops, using maps, diagrams and pictures of the hieroglyphs contained within.

LD-ROM^2 titles include such notables as *Quiz Econosaurus*, a kids' quiz game in which you can save the planet by answering questions correctly.

A game with lower ideals is *Virtual Cameraman*, which enables you to capture young oriental girls in various poses. It's up to you to choose your model, select the location, frame the shot and take a – suitably suggestive – snap at the right moment.

And, knowing the Japanese interest in young, scantily-clad girls, LaserActive's hi-resolution pictures will be put to equally dubious use in other titles.

LaserActive was launched in Japan last August, and made it into US stores around November time. With a European launch on the cards, **Edge** spoke to **John Banford**, PR and product development manager and **Jason Doran**, marketing coordination manager at Pioneer's UK headquarters...

John Barnford (left) and Jason Doran (right): PR and marketing manager respectively, at Pioneer UK. Those sheets hide top-secret hi-fi systems

Edge: Do you think we'll see a PAL standard LaserActive before the end of '94?

John Barnford: Yes, possibly: Pioneer have made this machine for the home market and the American market, so there's an awful lot of work to do before they can make a machine available for Europe. Forgetting games, just on the LaserDisc side, we want a dual standard machine. While we'd rather watch PAL discs because the quality is better, we still want NTSC capability as well to watch American discs.

Pioneer have got quite a lot of engineering work to do before we can have a dual-standard machine that will also play PAL Laser Mega CDs. As with LaserDisc historically, LaserActive will only be successful on the back of software provided with it.

Edge: LaserActive was quite expensive in Japan and America – how much will it cost over here?

JB: No idea, really: we know that in America, with a Sega pack, it's $1,200 or something. Now, history tells us that it tends to be dollars for pounds – how many of those machines would we sell in the UK at £1,200? Not a lot.

So if we're honest with you, we're not unhappy that we haven't got this machine in the UK at the moment. The longer we have to wait the more software there'll be, and we'd much rather say, 'Hey, we've got a new machine with 50 exciting titles to go with it', which is much better than what the Americans have had to do this

Interactivity – at a price...

A continual drawback with LaserDisc is the high price.

Even though LaserDisc is a popular format in Japan and the States, market penetration is still poor compared to VHS. The cost of discs and players is therefore inflated – and especially so in the UK, where good machines start at around £500 and decent movies are £40 a shot.

Even in japan, LaserActive is a costly piece of kit: CLD-A100 player: ¥89,800 (£560) Mega-LD module: ¥39,000 (£240) LD-ROM^2 module: ¥39,000 (£240) Karaoke module: ¥20,000 (£120) Mega-LD games: ¥2,500 (£15).

Of course, UK prices have yet to be fixed, but don't expect them to be any lower.

Continued next page

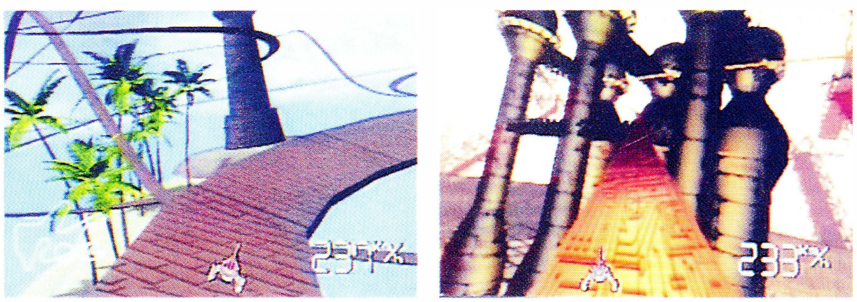
Rocket Coaster (LD-ROM^2)

Taito's first LD-ROM^2 game is set in the 21st century, where huge amusement parks feature the latest in thrill rides.

Rocket Coaster is simply a test of personal skill, rather than a race, as there are no other vehicles on the course.

You can choose from three circuits, each with a different theme: the easy Fantasy course is full of middle age castles; the intermediate course, Adventure, is littered with palm trees and pirate ships; and the last, most difficult, circuit is called Future. Unsurprisingly, this is a scenic tour through a futuristic city.

The aim is to stay on the circuit, while negotiating the twisting curves of the track. There are obstacles to avoid, like closing gates or fire-spitting dragons, and there are marks on the track which you can hit for extra speed.



The winding rollercoaster tracks of *Rocket Coaster* are well depicted in this shot of the Fantasy course (left). If nothing else the graphics are impressive, as shown by the Future circuit (right)

Like *MegaRace* on the PC, the success of the game depends on how well the car interacts with the scenery – clipping the edges of the course properly and being able to hit obstacles. But even then, its appeal looks slightly limited.

LaserActive

Home entertainment

Pioneer's MIDI system with built-in LaserDisc player

At Pioneer's UK headquarters, Edge was lucky enough to steal a glimpse of Pioneer's brand new MIDI home entertainment system.

As well as a turntable, cassette and radio tuner, it boasts an amp with Dolby Pro-Logic decoding plus combined CD/LaserDisc player.

For £1,000, this represents another step towards the single do-it-all unit. All it lacks now is the multimedia capability of LaserActive.

year, which is say, 'Hey, here's an exciting new machine and... er... we've got three disks.'

Edge: But you don't necessarily need to buy the modules...

JB: That's right. If you have the Pioneer LaserActive CLD A-100 with no plug-in modules – without the plug-in modules it's about $800 [£485] – it is just a LaserDisc player. It's a little bit more expensive – I'm sure you can get a similarly specified player in the States for more like $500 [£300] – so you're paying a bit extra because its upgradeable.

Edge: Are you becoming more concerned with the games side yet?

Jason Doran: A lot of research for our market is being done in America. We haven't at this stage got to get too involved.

JB: Because Pioneer is the champion of the LaserDisc format, our prime area of interest is what is happening with Digital Video; FMV or DV or Video CD, call it whatever you like. At the end of the day we are selling LaserDisc players in the UK and throughout Europe, we're not as yet selling LaserActive machines.

Edge: Do you think you'll be working with Sega Europe when the PAL machine is available?

JD: I'm sure we will be. Once the dates have been decided for a European launch, we will be talking to Sega, and Pioneer of Europe, because we're talking about a pan-European launch not just a UK launch.

Pioneer also manufacture the perfect accompaniment to LaserActive: this rear-projection TV has an impressive 50-inch screen

'People ask, why don't you produce a machine that does everything? Pioneer are now closer to that than anyone'

Jason Doran, marketing manager, Pioneer UK

Edge: Are you worried about the advent of MPEG Digital Video and films on CD?

JB: Whilst Pioneer is still a great champion of LaserDisc, and it is still the best quality video format you can have, Pioneer haven't had their heads buried in the sand. They're actually way ahead of the game with Digital Video technology, and interestingly a lot of that research is happening in the UK. One of our subsidiary companies, called the Pioneer Digital Design Centre, based in Bristol, are designing silicon and they are way ahead of the game on digital video encode and decode hardware.

Of course, in the domestic arena everyone's getting excited about movies on CD; which is new in consumerland, but in Japan they've had industrial karaoke systems, operating with full motion video off of a CD, for two years now. That was launched by JVC.

Pioneer thought, 'Hey, we can do better than that,' and they launched one about four months ago, using the latest chips that have come out of our research facility, and the results are mindblowing. It's a closed loop system: it will only play Pioneer discs because they are high density discs, called the Alpha Disc. And while the data rate of CD-i is 1.5 megabits/sec the Pioneer system is three times faster. *Three* times.

And that's Digital Video, but they're still not happy with it. They want it to be better still: they made that machine because market forces demanded it – karaoke is big business in Japan.

Edge: What's the thinking behind LaserActive? It is, after all, an expensive, high-end piece of kit.

JB: Mankind seems to be obsessed with making things smaller and more convenient. What LaserActive shows with video and games and so on, it's like, well, how about trying to make something really tasty, not just cheap and convenient. Something

High Roller Battle (Mega-LD)

Pioneer are themselves developing LA software, including the 3D helicopter gunship game, *High Roller Battle*.

In your war against the Jurak forces, you have to infiltrate the enemy's territory and destroy their secret bases across seven missions.

As with other LaserActive games, your mission destination is fixed, and the route precalculated. You have control over the targetting crosshair, and have to set your aim, lock on the right target and fire.

A large part of the game is the correct choice of weapons available to you at the start of each mission. Each mission has different requirements, as explained during a pre-briefing session. Knowing what you're up against, you must choose the right balance of cannon and missiles: select the wrong weapons and your armour won't be as effective against the enemy.

The graphics again are beautifully rendered, and everything whizzes along at a fair old rate. Successful kills are also rewarded with satisfyingly well animated explosions.

Pioneer's *High Roller Battle* puts you in control of a helicopter gunship. Your path is fixed, so you simply have to target enemy craft (left). Downed craft explode in the woods far below (right)

that is better than we had before. And I think that was Pioneer's reluctance to get involved with Digital Video right now because they know that LaserDisc is still the best.

Edge: So will Pioneer ever make a LaserActive MPEG cartridge – or dedicated DV players?

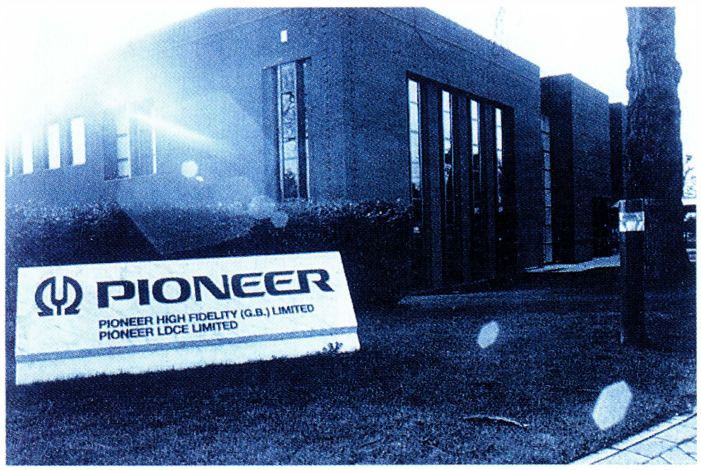
JB: Yes I'm sure that Pioneer will if market forces determine that they have to. And we wouldn't have to ask for anybody's help; we could do that, we could put a chip in there that was better than anyone else's chip, that can work three time faster.

Edge: Are you worried by the advent of Digital Video?

JB: I've been trying to force the head honchos at Tokyo to say where do we stand on this, and what comes back is pretty plausible and pretty credible, which is that LaserDisc won't be around for ever; technology is marching on at an astonishing rate. But Pioneer reckon it's going to be seven or eight years before we have Digital Video that's anywhere near as good as LaserDisc.

Also, imagine if you had a press release every Monday, that announced ten new [Digital Video] films. Ten – every Monday morning. It'd be, 'Wow, look at this!' But if you work it out...

JD: I have: it would take 15 years to get to the same catalogue as is currently available on LaserDisc. Because of all the complications and politics involved in getting a film out on LaserDisc.



Pioneer's UK headquarters in Slough. With LaserActive, the Japanese hi-fi specialists are hoping to break into the cutthroat videogame/multimedia market

JB: We think we've got a great library now of movies on LaserDisc, but I tell you, you've really got to go some with all the legal and contractual stuff, sleeve artwork, to do ten a month.

JD: We'd be lucky to get five out a month, on a good month.

Edge: How do you intend to position LaserActive in the marketplace?

JB: It's definitely a LaserDisc player that plays games; it's not a game machine that just happens to play LaserDiscs. And that's what gives it its edge: it's a machine that isn't useless, because from day one when you buy it, it plays currently available titles. Imagine if you're an America now, it plays all those LaserDiscs that are becoming a way of life in the States: it's more than one percent of households now, it's big. So forget LaserActive: 'What? There's only five discs available?' Well forget it then. It's still a LaserDisc player. And it plays audio CDs. And if you're into games, then buy one of the packs and it plays currently available software, it plays Mega CDs and PC Engine stuff.

So even though there isn't very much Mega-LD and LD-ROM² software, don't buy the packs if you don't want to: wait.

JD: From a marketing and consumer point of view, LaserActive is both a testament and an endorsement by Pioneer to the laser optical format, which everyone is now familiar with, thanks to the advent of CD; and also an endorsement of the whole

PC Engine problems

Already, some incompatibility problems have arisen with the CD-ROM² system.

Pioneer have had to issue a list of eight software titles that won't run with LaserActive's PC Engine pack: *Juuooki* (NEC Avenue), *Pastel Lime* (Naxat), *Graduation* (NEC Avenue), *Wizardry I and II* (Naxat), *Moonlight Lady* (NEC HE), *A Reisha De Ikoo 3* (Artding), *Super CD-ROM Experience Soft* (Hudson Soft), and *PC-Engine Hypercatalogue* (Shoogakukan).

No official explanation has been forthcoming from Pioneer regarding the discrepancies in NEC's hardware.

However, NEC themselves are unworried, as the software was released before LaserActive became available.

Continued next page

Vajra (LD-ROM²)

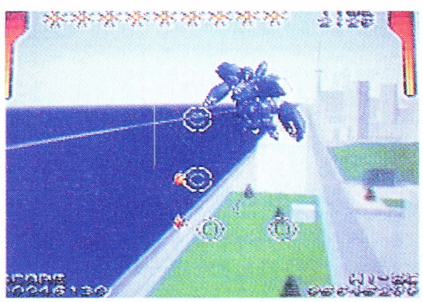
Pioneer are also sourcing tiles on the LD-ROM² format. The first of their efforts is *Vajra*, a firstperson shoot 'em up, featuring some very lovely rendered Japanese combat robots.

Set against a 3D landscape, each stage is a one-on-one dogfight with one of the huge hovering mechanoids.

Fully rendered images set the scene for the forthcoming battle, at which point the robot is displayed using NEC's hardware. The enemy characters are fully 3D animated, flying into and out of the screen, turning, rotating, etc. Each robot employs 100 different sprites to give the impression of realistic 3D movement.

Again, the player can only exert control over the gunsight and is merely swept along with the visuals.

The landscape scenery moves very quickly which, combined with the impressive 3D animation, makes *Vajra* one of the more impressive titles to come from Pioneer. Sadly, the LD-ROM² format means that UK gamers won't easily be able to get their hands on it.



Stunning rendered images ably set the scene for *Vajra* (left). Pioneer's LD-ROM² game has you dogfighting huge flying Japanese robots, in an unusual but playable shoot 'em up

LaserActive

The Sega connection

The LA controller (top) and Sega MD module (bottom)

Because of the lack of official PC Engine software, the only plug-in modules available to UK LaserActive owners will be the karaoke pack, and the Sega Mega Drive pack (which will probably come bundled with the system).

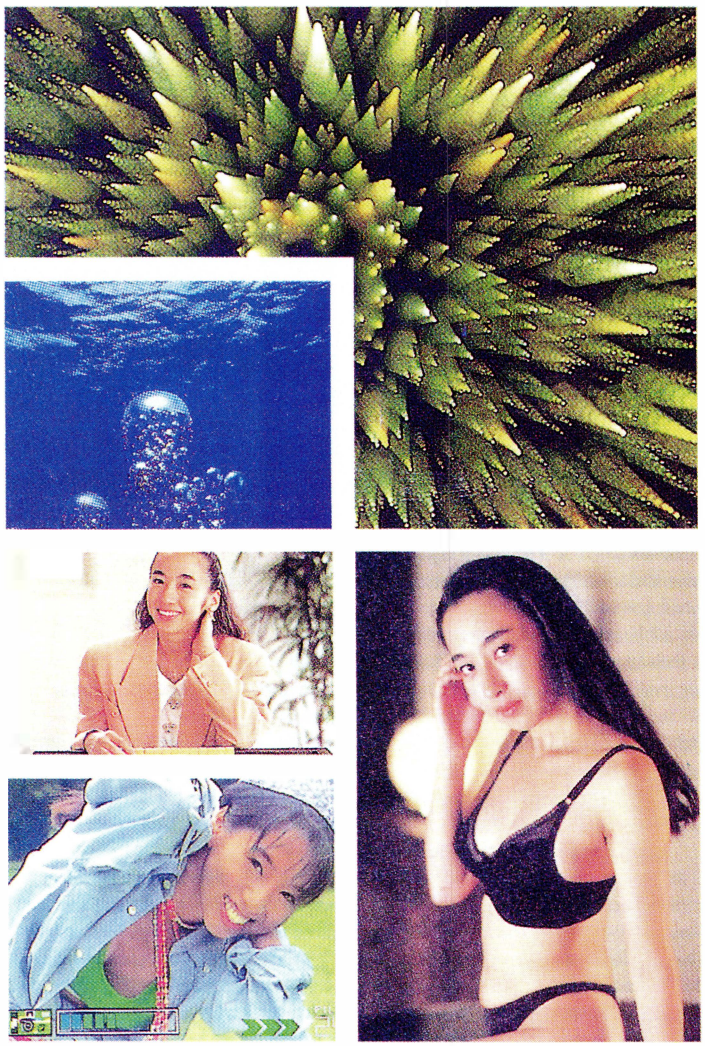
With the Mega Drive pack slotted in, LaserActive then plays Sega carts, Mega CD discs and also the joint format Mega-LD discs.

ethos of moving towards a home entertainment machine. People are demanding more from their home entertainment; they want more from their TV and their hi-fi and we've seen a huge boom in the games market. The growth is phenomenal and we'd be silly not to be in that market.

What LaserActive is basically saying is that Pioneer is at the forefront of the technology. People are always saying, why don't you just develop a machine that does everything? Well Pioneer are now closer to that than anybody else. We're now developing a machine that can almost do everything. I'm sure the machine could, if we wanted it to, play CD-i as well. Politically we won't do that, but there's a machine that could basically do anything. And I think you're going to see more companies move towards that.

With price, availability and quality of software so far against them, LaserActive hasn't got off to the best of starts. You could argue that it's in the same position as Philips' CD-i was about two years ago; but in two years' time LaserActive will be up against the likes of Saturn, PS-X, Jaguar II and possibly 3DO 2 and CD-i 2.

Another case of too little, too late, perhaps?



LaserActive titles from the sublime to the ridiculous: *3D Museum* (top right, top left), a library of animated images; *Virtual Cameraman* (bottom left) a candid photography simulation; and something that looks suspiciously like strip Mah-Jong (middle, right). (You should see the picture we *didn't* print)

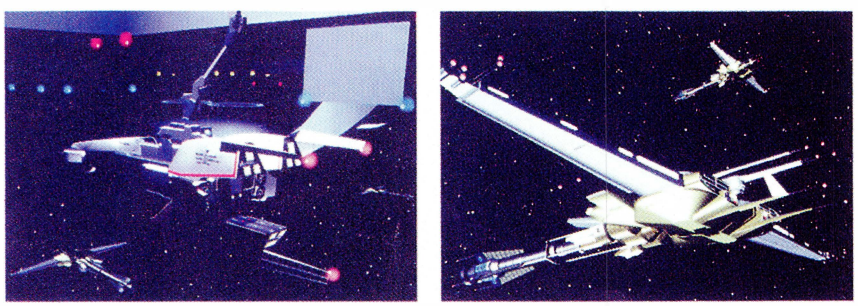
Space Berserker (Mega-LD)

One of the most impressive looking LaserActive titles is Pioneer's Mega-LD title, *Space Berserker*, a 3D shoot 'em up which features glorious rendered spaceships.

The fate of humanity hangs in the balance: alien aggressors have in their possession the eponymous 'Space Berserker', a device that far surpasses your simple beam weapon, and gives them the upper hand in the approaching conflict.

The United Nations Of Earth decide to launch a sneak attack in order to destroy the Space Berserker before it can be turned on your home planet.

Spearhead of the UNE assault is the Valkyrie fighter squadron, of which you are a member. During the conflict, your cockpit graphics include video images of your wingmen, and a female operator who proffers advice and instructions during each stage of combat.



The rendered spaceships of *Space Berserker* (above) wouldn't look out of place in The Last Starfighter movie. Of course, tying these into a playable shoot 'em up is another matter...

Space Berserker looks a lot more together than other LA titles. Certainly the graphics alone put it near the top of the LaserActive 'must play' list.

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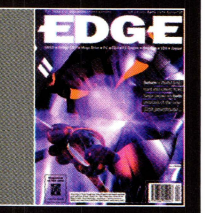
Doom: Evil Unleashed



Clearly the arrival of *Doom* doesn't have quite the same effect on the **Edge** office as it has elsewhere, although it is noted that some of Id's graphical excesses are enough to literally blow the player's mind – a warning that surely should've appeared on the game's packaging. Here's to *Doom II*, with talking baddies.

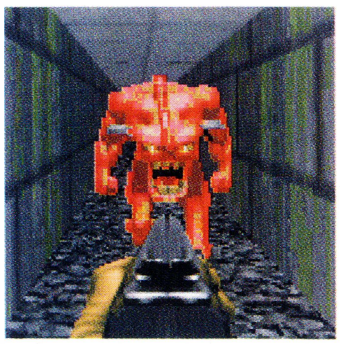
Format:	PC
Publisher:	Id Software
Developer:	In-house
Price:	Shareware: £35 for next two episodes
Size:	4 disks
Release:	Out now

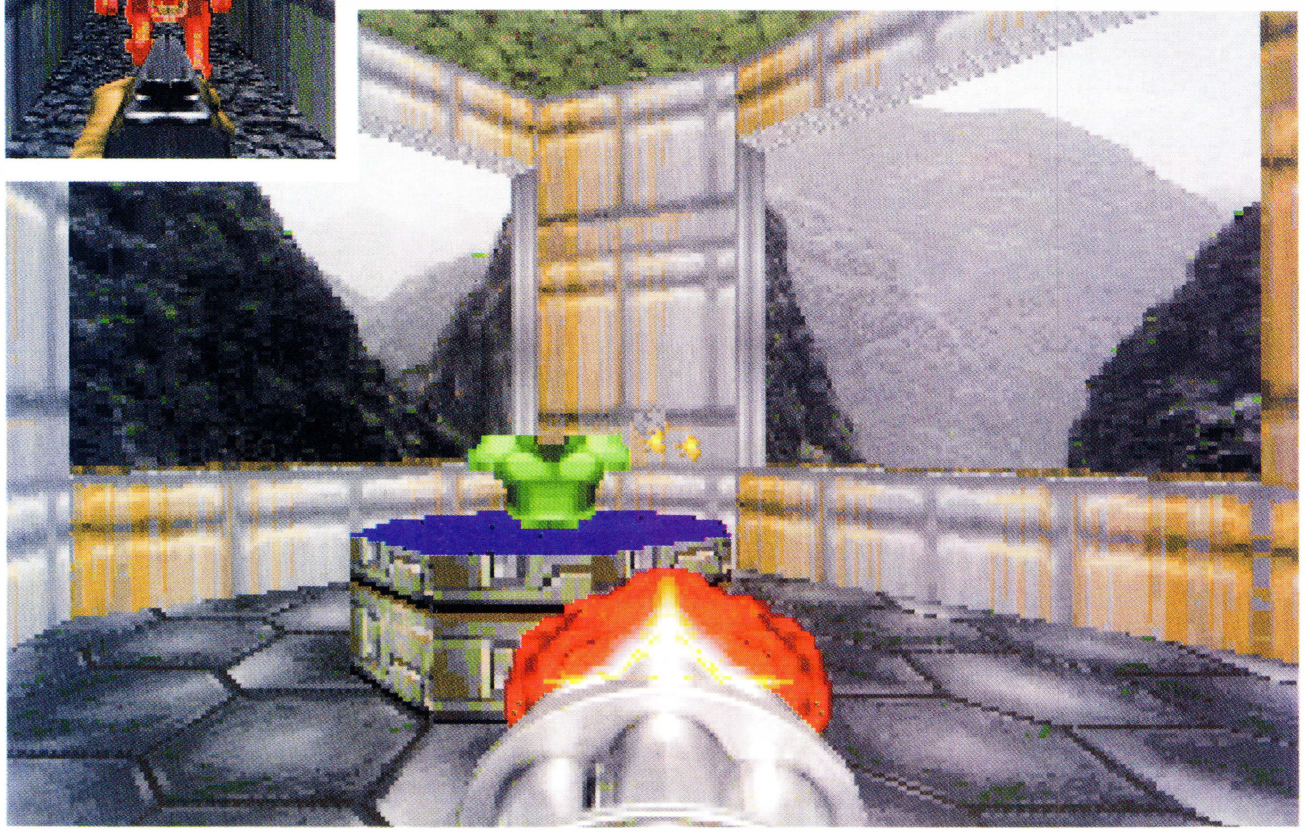
It doesn't seem rational, does it? Along comes a fairly simple 3D-perspective maze adventure/shoot 'em up, and suddenly hundreds of grown men start acting like they've never seen a videogame before – and even the normally sober PC press are turned into gun-mad fanatics. Huge ratings, rave reviews across the board... No-one could deny that Id Software's *Doom* has caused quite a stir – on both sides of the Atlantic. And that's before the full version is even out in the shops.

It's got to go down as a marketing coup: by releasing the first episode of their new game as shareware, Id have managed to whip up and control a vast torrent of nigh-frantic bulletin-board trading. Well, you write a game as immediately playable as *Doom* and ship it with the message, 'please distribute like crazy' and you're guaranteed a big audience. And *Doom* looks like following its forerunner, *Wolfenstein 3D*, in becoming *de rigeur* games software in offices and homes throughout the Western world.

Basically, the way it works is that the first episode of *Doom: Evil Unleashed* is free. Anyone can get hold of it, and they can play it until they're sick of it – or can just discard it straight away if they don't like it. The next two episodes you have to pay for. So get hooked on *Doom* and you'll probably want to buy the rest of it. Interestingly, though, Id Software are also planning to release a more conventional all-in-one, buy-it-in-the-shops version of *Doom* later this year.

One thing that this distribution policy ensures is a vast, vast audience. Almost every PC in the world seems certain at one time or other to have the code to *Doom* ticking away on it. That obviously means that the game





From the earliest scenes of the first episode, you can tell you're in for a treat with Doom – like the way the mountains scroll totally convincingly behind the windows (above). And the action's all yet to come – like the charging pink shotgun fodder (inset) you meet later in the episode

The range of scenery in Doom is certainly the game's best feature – like the flame-filled caverns (middle), the stunning Alpine splendour of the first level (bottom right), and the fiery views of the second episode – complete with grotesquely massacred corpses (below right). Yep, there's something for everyone here

needs to be kept simple. You don't want anyone losing interest, or being unable to play, because they don't have the manual, or a joystick, or a sound card, etc, etc. And the real beauty of *Doom* – and yes, even a game as undeniably violent as this can have an element of beauty – is the way it works so well within this limitation.

Doom will run okay on almost any hard-disked PC, but play it on a high-end system and it is immediately recognisable as a very, very impressive piece of software, with graphics technology way up there with the *Strike Commander*s and *Comanche*s of this world. And the speed at which it all works is nothing short of breathtaking.

The differences between *Doom* and the now primitive *Wolfenstein* are obvious at first glance. Firstly, Id have got a lot better at clipping sprites in three axes – which means simply that the action in *Doom* happens on more than one level. There are stairs for you to climbs, lifts to find, and aliens firing at you from windows and balconies high above the ground. This adds major new depth to the action – go back and play *Wolfenstein* and you'll laugh at the horrible 2Dness of the 3D perspective. It also makes games like 3DO's →

Power ups

Doom has a healthy selection of power-ups dotted throughout its many levels. Don't expect to survive for any length of time without using them – but be warned, some are very tough to find. Often you'll have to risk a great deal of your health to find the much-needed bonuses listed below.

Health bonus. The most common power-up. Each of the flasks of blue, soothing liquid increases your health rating by 1%.

Medipaks. Take the form of a small white chest with a red cross. Each one gives you a 10% health increase.

Stimpaks. Identical in appearance and effect to the ubiquitous Medipaks. Stimpaks provide a boost of raw adrenaline (or maybe testosterone) to help you along in your mission.

Berserk. This green medical pack is very hard to find and only available on later levels. It gives you the ability to literally tear people apart with your bare hands. It also greatly increases your weapons' rate of fire. The effect of this pack is highly satisfying, but it's shortlived – you can expect to get only 30 seconds' boost.

Invincible. A green orb with a human face in it. As its name suggests, it renders you invincible, for 30 seconds.

Invisible. A red and blue orb that makes it hard for your enemies to see you, particularly in the dark corridors – but although they're firing blind, they still usually manage to hit you.

Radiation suit. This lets you walk through the green/red/blue poisonous gunk without your health going down.

Light amplifier. Another shortlived effect. It allows you to see clearly in the near pitch-black tunnels.

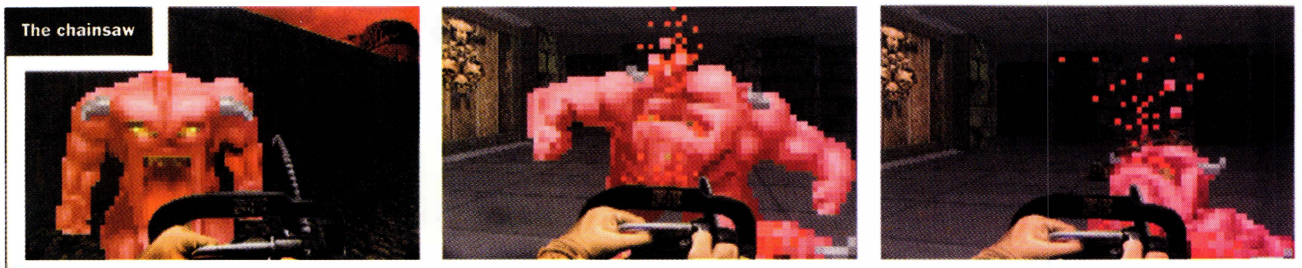
Armour. Wearing armour greatly reduces the impact of enemy fire on you. There are three types: the first is a helmet which bestows a 1% increase; the second is a green chestplate which gives you 100% armour; the last is a blue chestplate which can double your armour.

Continued next page

Go berserk

The Berserk mode is only available if you find the power-up – it looks like a small black medipak, and lurks on later levels of the game. The power-up lets you give your guns a rest – you now have the power to tear the bad guys apart with just your fists. Oh yeah, and your spiked knuckleduster

testscreen



Ah yes, the chainsaw. A beautiful weapon – even the biggest bad guys don't seem quite so keen on a full-frontal attack after you've just carved up one of their friends like this. The sound effects are about as close as you can get to the sound of a chainsaw massacre as well. What fun

Weapons

There are seven weapons in all. Each one is brilliantly animated, and the step-up between each weapon is suitably awesome.

Pistol. You start the game armed with just a pistol, but even that can fire up to 200 shots before you need to reload it. If you die during any level you return to the start of that level, again armed with the pistol.

Shotgun. The first weapon power-up gives you a pump-action shotgun. The bad guys no longer fall down – now they're blown clean off their feet.

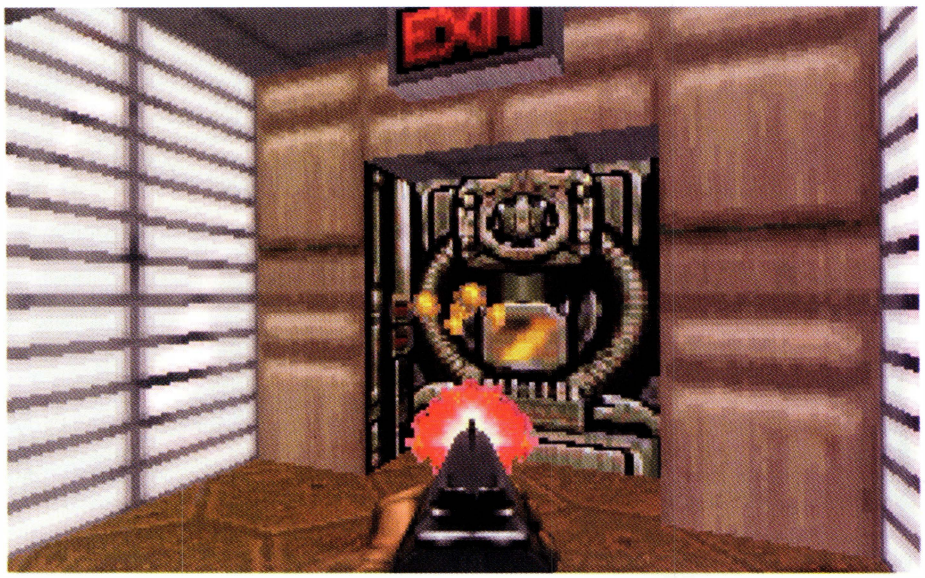
Chainsaw. The next weapon you can expect is a powerful chainsaw. It's best to only use this for closeup work (although chainsawing through a whole crowd can get slightly messy). With this meaty implement in your hands, your enemies don't seem quite so keen to take you on.

Multibarrel machine gun. Watching those grotesque lizard creatures dance around as the bullets rip into them is deeply, and rather worryingly, satisfying. Get your hands on this and suddenly you start getting into this game in a big way.

Rocket launcher. Not much to say about this. It fires rockets. They embed themselves inside your enemies' flesh. They (rocket plus enemy) explode; blood sprays everywhere. You'll face the bosses of the first episode armed with this gun.

Plasma gun. This weapon is apparently reserved for the second episode. It unleashes a bolt of blue electricity which flattens all but the hardiest of ghouls.

BFG. No prizes for guessing what this might stand for, but it sure is one big, er, gun. Anyone on the receiving end of the BFG's mega-powerful bolt is quickly turned into a small, smoking pile of ash.



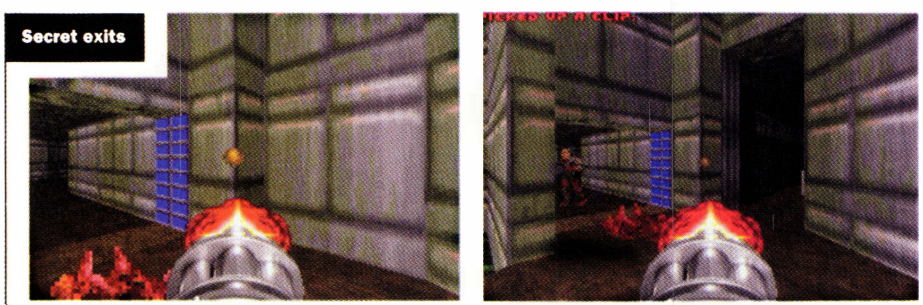
The Exit. It's there on each level, but sometimes it's very tough to find. Sometimes it's even worth a blast or two with your shotgun when you find it. Doesn't really help much, but it makes you feel good

Continued

←new *Monster Manor* (Testscreen, page 79) look totally passé before they're even out in the shops.

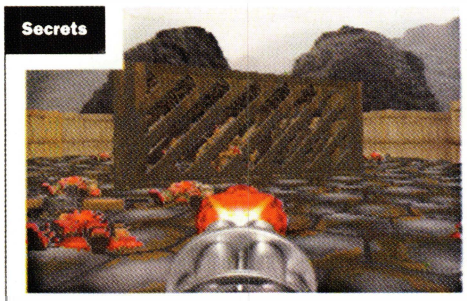
That said, though, there are problems with the game (Edge has no intention of joining the rabble mindlessly praising *Doom* beyond its worth). Yes, it is good – in fact it's a very, very technically impressive piece of programming – but where's the genuine 3D (look up and down) of *Ultima Underworld*? Where's the variety in the gameplay (it's all just kill, kill, kill)? And looking at it coldly, what is there really in *Doom* (apart from the graphics) to set it above even the most average, most highly repetitive and tedious 2D shoot 'em up?

Okay, there are some visual touches in this game that will literally blow your mind – like the scaling and parallax on the distant mountains – but then everyone said much the same about the hi-res images in *The 7th Guest*. They may look great, but what do you do with them? You don't ever get to explore



Some of the secret panels are almost impossible to spot. But spot them you must if you plan on surviving the horrors of the mazes in *Doom*. Power-ups, big guns, health points... they're all hidden here

Secrets



A totally secret level in the first episode sees you in control of an oversized machine gun, facing a pen of caged lizard creatures in their barracks. It's a psychopath's wet dream... and they can't even fight back

those distant mountain ranges – they're really little more than impressive padding (as in *The 7th Guest*, you're just meant to watch them – in awe).

Doom is certainly a gorgeous-looking game – it has also, incidentally, made serious advances in what people will expect of 3D graphics in future. But the gameplay is as narrow as it gets: you run along beautifully parallaxed corridors and through stunning 3D rooms shooting at a near-endless supply of green lizards. That's it. Still, we're not going to deny that there is a worryingly addictive fascination in watching the frantic despatching of those little green guys.

On the plus side, some of the lighting effects in the game are truly scary. Everyone at one time or another has described some videogame as scary – and as we all know, they're never scary to anyone with an IQ above, say, 12. Well, that's one generalisation that *Doom* shatters: walking through the computer centre with the lights flashing slowly and rhythmically, and turning to find one of those hideous pink beasts running behind you is a seriously intense videogame experience.

It's just a shame that the number of enemies is fairly limited. After a while, the multiple pump-action, blood-spraying demise of yet another pink monster is only marginally satisfying. If whenever you turned a corner you could be met by some new, more grotesquely deformed creature than the last, then at least *Doom* could boast that it had replaced gameplay with real horror.

As it is, once the power of *Doom*'s graphics has worn off (they're amazing, so give that at least a week or two), you'll be longing for something new in this game.

If only you could talk to these creatures, then perhaps you could try and make friends with them, form alliances... Now, that *would* be interesting.

Edge rating: **Seven** out of **ten**

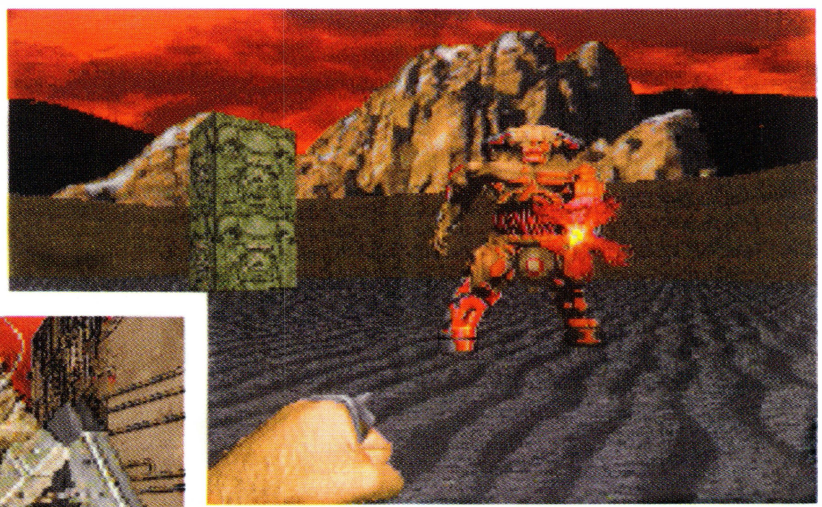
Secrets

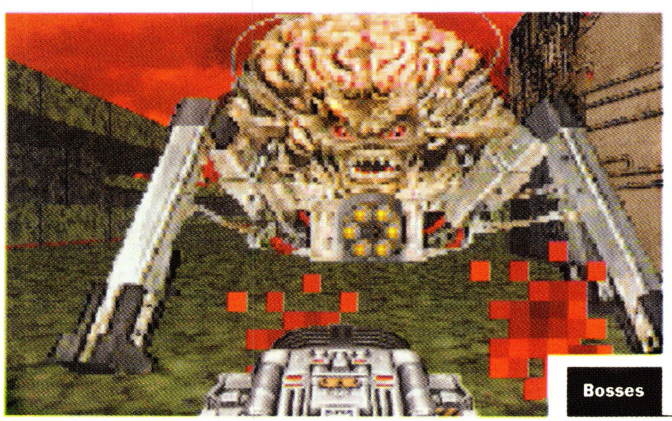
As with their earlier creation, *Wolfenstein 3D*, Id Software have programmed hundreds of secret passages into the mazes in *Doom*. You have to explore every wall with great care, and some secret doors are even obscured by objects that you have to blast aside.

When you reach the end of each level, the game informs you of the percentage of secrets you discovered on that level – and you're doing well if you find 50% of them. The secrets in *Doom* really give the game that incredible 'Go back and see what you've missed' element.

Most of the secret doors can be spotted if you look carefully enough. A slight difference in light shading, suspicious metal pillars on the wall for no reason, an alcove just before a doorway – these are the kind of visual clues you should be on the look-out for. All the big power-ups are secret, and to get your first chance at most of the big weapons you'll need to crack the secret passages on each level. Okay, you can just whip through, but there's always that nagging doubt: 'Just what did I miss back there...'

We don't want to give too much away here, but non-secret hunters will in fact miss at least one entire level – the first episode gives you a secret bonus chance to wipe out hundreds of the aliens in their army barracks. But no-one's forcing you to see that bit...





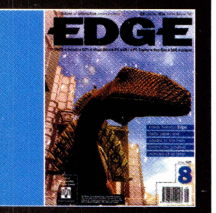
Bosses

There are three main bosses in the three episodes of *Doom*. The pink/brown things are in episode one (top left), a rocket-toting guy (above) lives in episode two, and the spiderdemon guards episode three (left)

Daytona shows up at **AOU, page 8...** Revolutionary **3D games** system unveiled, **page 12...** NEC's new **Arcade Cards**: the **PC Engine** gets upgraded, **page 14... PS-X** publishers receive development tools, **page 13...** Date set for launch of **UK 3DO**, **page 16...**

Cutting Edge

The very latest **news** from across the entire world of videogaming



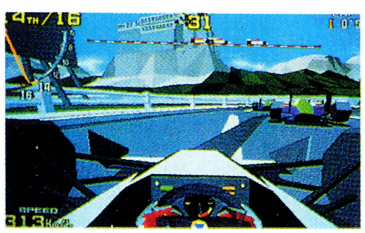
Sega's next-generation plans appear to be getting muddled as one of its proposed new consoles becomes a Mega Drive add-on. With performance that promises a jump at least as large as the move from Master System to Mega Drive, though, and *Virtua Racing*/*Fighter* ports, it could well work. Couldn't it?

Mega Drive boost: next stop **Mars**

Sega's lofty ambitions for 16bit systems bring another planet into view

Sega's worldwide publicity steamroller went into overdrive on March 14 as several new hardware projects leaped into the fray, against a backdrop of speculation about existing plans for Saturn. Sega revealed that work would cease on the Jupiter, the 32bit Saturn-based cartridge machine and would be switched to a similar project, codenamed Mars, destined initially for the US and European markets.

Mars differs from Jupiter in that it is a 32bit upgrade for existing Sega 16bit hardware. Designed to plug into the Mega Drive's cartridge port rather like →



Virtua Racing **fans will be overjoyed with Mars – Sega have promised *VR Deluxe***

Sega's *Virtua Fighters* will not only be one of the first two Saturn games, but now Mars is coming you can expect a 32bit Mega Drive version too

MD gets carried away

Sega Japan have just launched a new handheld version of the Mega Drive, called The Megajet, at a cost of ¥15,000 (£90). The machine, complete with small LCD screens, is currently being used on first class JAL flights, but the home version is effectively a portable singleplayer machine that plugs into the TV.

The arcade racer *Daytona GP* (above) will be available on Saturn at launch

Titan: Sega's 2D testbed for Saturn

Edge has uncovered details of Sega's 32bit Titan arcade board. What was initially thought to be a spin-off or successor to Daytona's Model 2 hardware is now understood to be based on 2D technology. One rumour suggests Titan technology will be licensed to other coin-op companies, effectively giving them a Saturn test platform in the arcades.

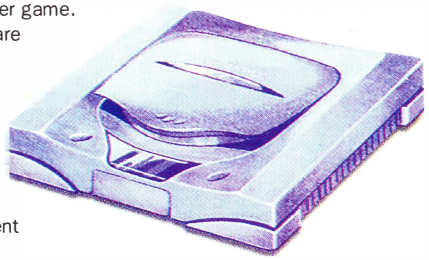
If Titan is successful, Saturn could well end up with a catalogue of coin-op-perfect arcade games.

← the Master System Power Base Converter, Mars boosts the performance of the 16bit console with two Hitachi SH2 chips, extra RAM and a newly designed video processor. And it will even upgrade the capabilities of the Mega CD when Mars-compatible games are programmed for it. The system will be known as the Genesis Super 32X when it's released in the US this Autumn at a cost of $150 (£100), with a UK version following around Christmas this year, priced at £150. Developers are expecting to receive Mars development kits in April.

Apart from Saturn, which will arrive much later in the US and Europe than Japan, an all-new Mega Drive incorporating the Mars technology will be appearing in early '95 for £175-200, completing the line-up.

But just what kind of performance are we talking about here? One Sega official claimed that the technological jump would be 'at least as big as the one between the Master System and Mega Drive'. Mars promises over 256 onscreen colours, high-speed polygon rendering, texture mapping, improved software motion video, enhanced scaling and sprite rotation, and (deep breath) improved sound, with the aid of a new chip. All in all, an impressive bundle of technology.

Sega have announced that they have more than 30 titles in development for the new kit, including *Virtua Fighters*, *Virtua Racing Deluxe* and a 3D soccer game. Third party licensees are expected to deliver a similar number during the first year after the unit's introduction, with pricing of the new software expected to be in line with current 16bit prices.



Saturn now includes a 64bit video processor

So where does Saturn fit into this grandiose plan? In Japan at least, it doesn't. The failure of the Mega Drive in Sega's home market means that Saturn will instantly spearhead Sega's 32bit assault in November this year as planned, with US and European versions following in 1995. **Edge** understands that Saturn will offer a significant leap in performance over Mars-boosted 16bit hardware. As hinted last month, news about Sony's PS-X has prompted Sega to up Saturn's specs and a 64bit video processor is thought to be just one improvement.

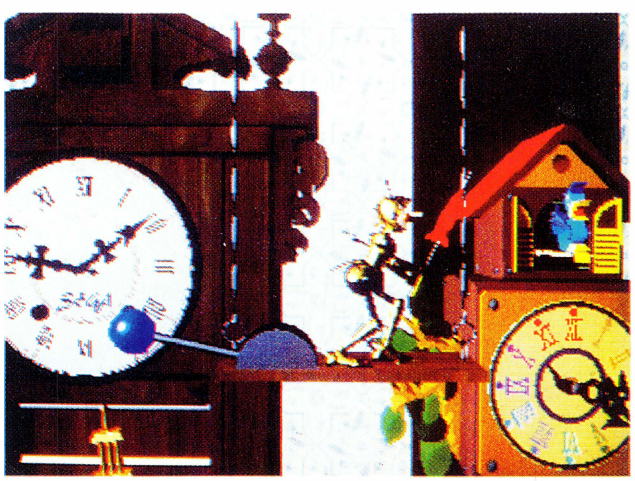
So, while the US and Europe start drooling at the prospects of 32bit Mega Drive and Mega CD games, Sega Japan are pressing on with Saturn. On February 14, over 300 developers were shown a mock-up machine, as well as development tools and demos of games in development. 12 Saturn titles are expected during November and December '94, with 17 more between February and March 1995 and 12 between May and July. On top of that, thirdparty licensees will deliver 35 titles for the first half of 1995.

And the first Saturn games? *Virtua Fighters* and *Daytona GP*. Whichever way you look at it, Sega seem to have it covered. Let's just hope they don't run out of planets before the next level truly arrives...

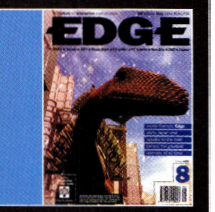
Where is it?

This is the place where, in June, Sega will be showing off its up and coming products, and where Sega's thirdparty licensees can discuss all matters Sega. The event will be taking place in America, near a major tourist attraction

***Virtua Soccer*, perhaps? Still without a title, this soccer game in development for Saturn features an excellent texture-mapped stadium and detailed players**



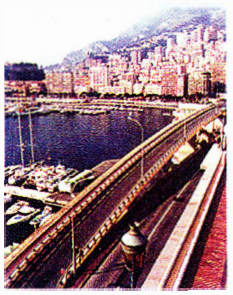
This clockwork doll 'action' game introduces proper 3D backgrounds and animation. See that cuckoo in the clock? It's made of polygons



Edge's new 'diary' section (actually introduced in E7) details the team's manoeuvrings over the last four weeks, including a trip to Monte Carlo and a jaunt to Paris, home to two 16-year-olds who're convinced they're making 'the first interactive movie that actually works'. The hokey-cokey bits certainly look good.

This Month on Edge

A heady concoction of rumour, late news and minutiae, distilled and blended by **Edge**



Sunny Monte Carlo, setting for the Computer Arena '94 conference

Each year, the computer and videogame industry holds a conference in which specific topics are discussed at length. This year the venue was Monte Carlo in Monaco; **Edge** was in attendance.

After two days of conferencing, 680 minutes of dialogue and 23 speeches, the general feeling was one of confusion and disillusionment. The market is very flat at the moment, with cartridge sales down, discounts up, and customer interest apparently on the decline – and this situation looks set to continue over the summer.

However, it wasn't all doom and gloom: the nascent hardware platforms should give the market a shot in the arm for '95. And in the meantime, the PC continues its march into homes across Europe, with prices continually falling and power on the increase – Intel intend shipping over a million Pentium chips this coming year.

But the most important thing is that **Edge** managed to win 350 francs (£43) on the roulette wheel.

The latest rumour in Japan is that Nintendo have several new hardware projects in progress. As well as news of a handheld version of the 8bit Famicom, there are whispers of a CD-ROM drive for the Super Famicom – which could be unveiled at the Famicom Space World show in August. Watch this space...

Will the basic Jaguar soon be supplemented by a CD-ROM drive with an extra graphics chip?

Atari's Jaguar CD-ROM drive is currently shrouded in secrecy, mainly because the final specs haven't yet been determined. Some developers are being asked what features they want to see, and there is even speculation that Atari might be including a texture-mapping chip (something it could certainly do with) to beef up the system in the face of new competition. An Atari development conference is scheduled to take place after the ECTS.

This issue's review of *Tempest 2000* nearly didn't happen: the single pre-production ROM in Atari UK's possession was constantly unavailable due to massive demand – managing director Bob Gleadow's kids had it at home to play over the holidays. In the end we got hold of a packaged copy at the last minute – and even before Jeff Minter got his.

In the wake of a slightly disappointing 2nd Future Entertainment Show, Future Publishing has now retargeted the event, which now goes by the name of Future Computing '94.

The show has shed its glitzy games angle to become an all-formats affair, embracing all machines, including the

Sigeru Miyamoto, Nintendo's videogames hero. (Endorsement of Edge by Mr Miyamoto is in no way implied by this photograph, incidentally)

Edge recently saw a demonstration of a new operating system called Taos (pronounced 'dow-os'). This hardware-independent, heterogeneous parallel processing language might be a major step forward in the battle against incompatibility and obsolescence. Full details in Edge 9

(From left) Chris Hinsley, Tim Moore and Francis Charig from Taos Systems – are these men about to change the shape of videogaming?

new platforms, and covering emerging technology like CD-ROM and FMV.

It is to feature hands-on displays, plus demonstrations and workshops hosted by Future Publishing's editorial teams. With an earlier venue date of 26-30 October, FC94 is all set to be the main event for the interactive entertainment industry.

Some encouraging news for PC owners: Argonaut are working on a 3D graphics card specifically designed to render polygons at high refresh rates. No news on how powerful it will be or its proposed cost as yet.

Forgotten Castle – the only PC game to surpass *Doom* in the looks stakes – has been canned as a result of its development company, Twin Dolphin Games, going into liquidation. Several companies are now interested in picking it up.

Sega have relied on shock tactics once again, announcing that they will not be present at this Summer's CES in Chicago. Instead, they will be hosting their own plush convention in Disney World, Florida, with developers getting their own hotel suite for... $25,000. This news comes at the same time as speculation suggesting that Nintendo's traditionally quiet period is about to take an upswing. The company is expected to have four new SNES games on display at CES – of which two will be Super FX titles and one will be a follow-up to *Super Mario World*.

Three Project Reality games are thought to be in development already at NCL's Entertainment And Analysis Department. *Zelda*, *Metroid* and *Mario 5* are apparently being worked on, with *F-Zero 2* on the drawing board.

Jaguar CD games: Rebellion are preparing to release a CD version of the 3D dungeon game first talked about in **Edge** 4; Imagitec are planning to release *Freelancer* for the Jaguar's CD drive; and ATD have *Battlemorph*, sequel to *Cybermorph*, winging its way onto the CD-ROM, featuring texture-mapping, trading elements and more structured gameplay. And Argonaut will have the rather slick *Creature Shock* on a silver disc for Atari as well. Also, **Edge** has heard that *Syndicate* and *Theme Park* will soon be making their way onto the Jaguar, courtesy of a major UK publisher.

A Tokyo-based publisher is releasing a book in April about the Japanese games industry and its position in the multimedia world. Selected opinion makers featured in the book include David Sheff (author of the Nintendo story, Game Over), Sigeru Miyamoto (Nintendo's executive game producer), Mr Irimajiri (VP of Sega Enterprises), and **Edge** (the future of interactive entertainment). Shame it will only be available in Japanese.

Expect a stunning CD-ROM game, *Heart Of Darkness*, to be unveiled at next month's ECTS. Paris-based Amazing Studios, headed by Frederick '*Flashback*' Savoir and Eric '*Another World*' Chahi, are reputed to have created the most stunning animation yet seen.

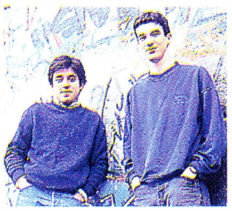
Edge has just heard that Philips' CD-i will be bundled with a digital video cart and *Caesar's Boxing* for an extra £50. Which puts it, pound for pound (and dodgy game for dodgy game), roughly on a par with Commodore's CD^{32}.

Sources close to Konami have hinted that *Contra* for the Mega Drive will be better than the SNES version but have less variety, mainly due to the Mega Drive's lack of rotation and scaling facilities. Still, the game is already looking better than the company's lacklustre conversion of *Castlevania* for the Mega Drive.

SNK are introducing a re-designed Neo-Geo this year. Same performance, lower cost, and the mumblings about a CD-ROM drive continue.

Finally, *Virtua* *Fighters 2* is on the way, with texture-mapped, smooth-shaded fighters, two new characters (a Thai boxer and an American ninja) and weapons as well.

A Future Publishing editor recently had the pleasure of interviewing Sigeru Miyamoto at Nintendo's headquarters in Kyoto. When handed a copy of Edge 6 for his perusal, Miyamoto-san took one look at the cover and was heard remarking, 'Ah, Steve Jarratt-san'. In return, our esteemed (and now very big-headed) editor sends his regards to the greatest game designer of our time

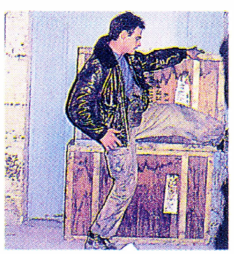


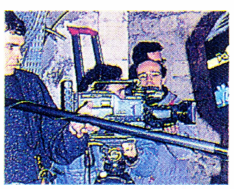
Youthful French filmmakers Nic Mathieu and Greg Glachant

Virgin are currently shooting film footage in Paris for a game with the working title of *Scavenger*, consisting of an ambitious marriage of digital video and action. Edge was invited for an exclusive sneak preview.

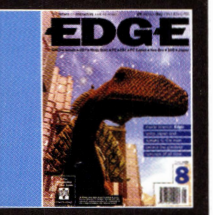
The most interesting thing about the production, apart from its scale, is the fact that it is written and directed by two 16yearolds, Nic Mathieu and Greg Glachant. Developers Cryo were approached by the lads with an impressive home-produced video of their own game concept, and decided it was simply too good to turn down.

Basically, what *Scavenger* is trying to do is become the first interactive movie that actually works, taking the *Mad Dog McCree* approach and turning it on its head. Targeted primarily at PC CD-ROM, it is due late '94.

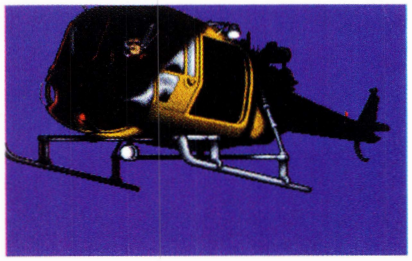




The lead actor struts his stuff (top). Filming in progress (above)



Ocean ramps up development for next-generation platforms, focusing on Atari's Jaguar. The company's *Lobo* project, destined to appear as a CD title, certainly looks the part, while *Apeshit* throws up some interesting twoplayer coop gameplay environments on hardware it calls "a creative challenge".



Clockwise: ***Apeshit*** **(Jaguar),** ***Green Lantern*** **(SNES) and** ***Central Intelligence*** **(PC)**

Ocean Software

Ocean are one of the first thirdparty developers to jump on the Atari Jaguar bandwagon; but where is it taking them?

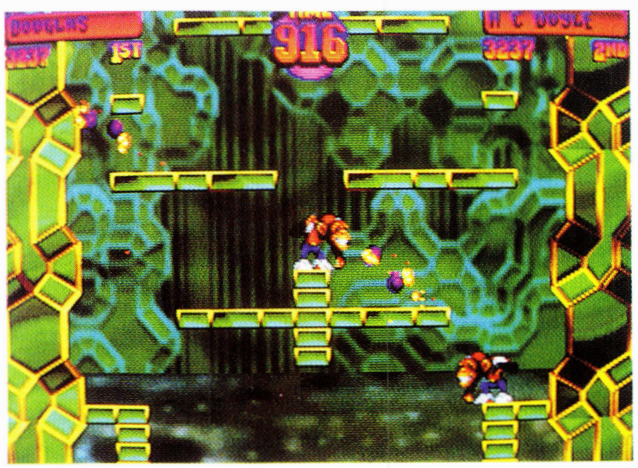
One of the most attractive buildings you'll find in Central Manchester is Eastgate, Ocean's stylishly understated headquarters dominating the newly gentrified Castlefield area. **Edge** dropped in on software development director **Gary Bracey** to check out the company's new-found commitment to Atari's Jaguar.

With the 16bit market slowly diminishing, Ocean are counting on Atari's new machine: 'We'd like Atari to succeed primarily because we're looking for a replacement format,' admits Gary. Ocean are currently juggling two projects: one cartridge game and one CD game.

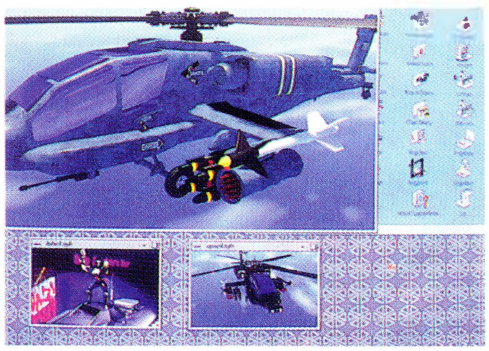
The cartridge project, *Apeshit* (a working title, we hasten to add), was originally undertaken by Warren Lancashire, who shaped the excellent *Pugsley's Scavenger Hunt* on the SNES. His return to the company after a break means he will continue to be involved with the project.

'A platform game with a difference' is hardly a description to inspire confidence, but if only for the wonderfully colourful graphics, *Apeshit* looks quite smart even at this early stage. While *Crescent Galaxy* might have given some indication of the Jaguar's sprite handling abilities, *Ape* could prove to be a benchmark parallax scroller for Atari's machine. Described by programmer **Bobby Earl** as 'a mixture of *Mario*, *Bomberman* and *Pang*,' *Ape* is essentially a simultaneous twoplayer cooperative

'We'd like Atari to succeed,' admits Ocean's Gary Bracey



Apeshit**, sporting some of the nicest graphics yet seen on the Jag. The final name has not yet been decided –** ***Monkey Business*****, perhaps?**



More great graphics from *Apeshit* (left), and SG rendering for *Central Intelligence* (PC)

A Silicon Graphics-rendered *Lobo* – Ocean's first project for Atari's forthcoming Jaguar CD drive

platform game with traditional console-style play mechanics.

With much of the game design yet to be implemented, the most appealing aspect of *Ape* is the silky smooth 16bit-colour parallax scrolling. 'All that requires is the 68000 and the object processor,' reveals Bobby, ' but we'll be using the GPU and the blitter for creating some clever 3D effects in the backgrounds.' The backgrounds in question were drawn freehand by artist Ged Cafferley before being scanned directly onto the screen.

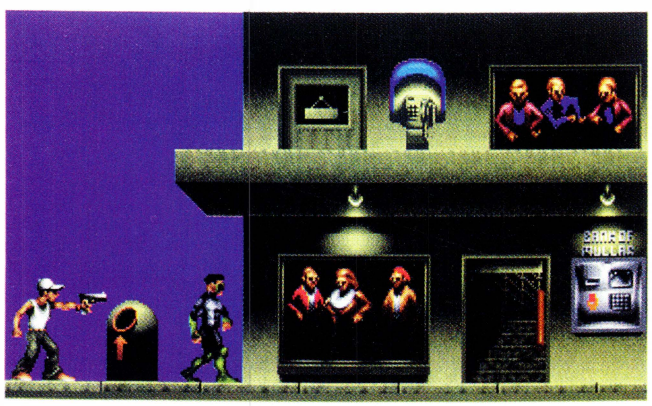
Ocean's other Jaguar title, *Lobo*, is based on the violent comic character of the same name and is an altogether more ambitious project, destined for the CD drive. 'The concept of the game is very, very new and at the moment we're simply experimenting with the game style and how it'll work on the Jaguar.'

'We see the Jaguar as a creative challenge rather than a technical challenge'

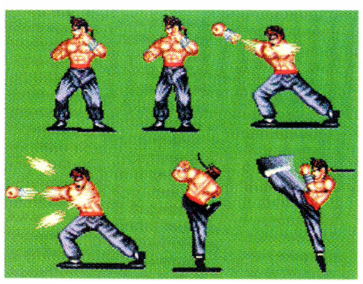
Gary Bracey, Ocean Software

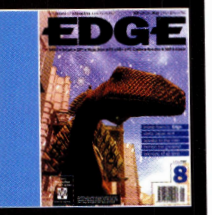
To fire the imaginations of the guys involved, a roomful of Silicon Graphics workstations is being used to mock up 3D rendered game environments. Some of the video sequences are expected to run at 25fps on the Jag's double-speed CD drive.

Gary sums up the company's new direction: 'We see new machines starting with the Jaguar as a creative challenge rather than a technical challenge. We're moving away from the traditional movie licence, and the philosophy now is content, quality and originality. A good programmer on the Amiga will usually be a good programmer on the Jaguar – it's that simple.'

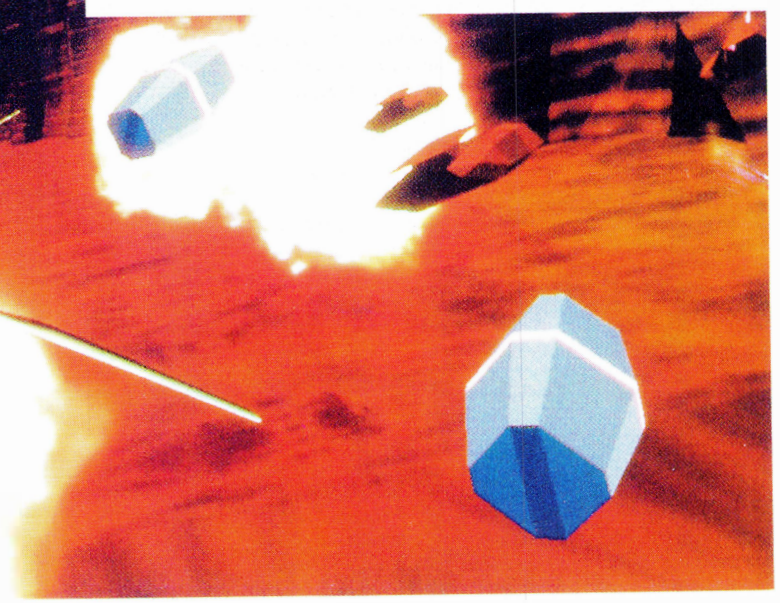


Ocean's predilection for platform games is confirmed with their latest Mega Drive and SNES project – *Green Lantern*, based on the US comic





A trip to Namco's Japanese HQ delivers the opportunity to get intimate with the company's astonishing System 22 coin-op technology, debuting with *Ridge Racer*. Perhaps of even more interest, though, is the promise of a "100% translation" of the game to Sony's forthcoming PS-X hardware. That would certainly shift units...



The apex of Namco's coin-op technology: *Ridge Racer* (top) and *Galaxian³* (above). The developers (centre) and their R&D headquarters

Leader of the Pac

Namco are among the true pioneers of the coin-op business. **Edge** went to Japan to meet the driving force behind *Ridge Racer*

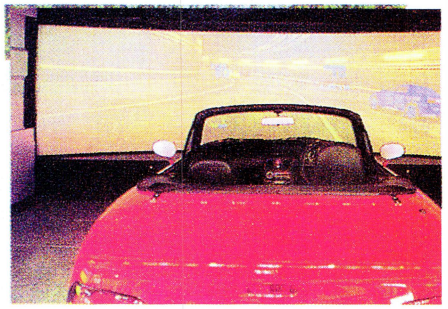
Ever since the first *Galaxian* and *Pac-Man* machines hit arcades almost 14 years ago, Namco have gained a reputation as consistent coin-op innovators. Founded in 1955 as the Nakamura Manufacturing Company (after its boss, Masaya Nakamura, a man who went on to become one of the most powerful figures in the Japanese videogames industry) the company has developed from small beginnings, manufacturing kiddies' rides, to become one of the powerhouses of the international arcade business.

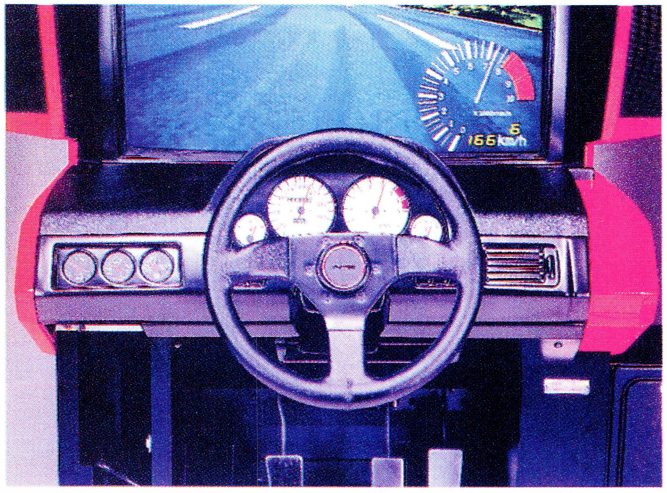
So it was a rare privilege when these videogame legends played host to **Edge** in Japan. Namco have five main buildings in the greater Tokyo area, plus a chain of 22 offices throughout the country. **Edge** was the guest of their research and development department for consumer and coin-op games, which is based near Eda in the Tokyo suburb of Mirai Kenkyusho and contains around 200 people working on coin-op projects and console software.

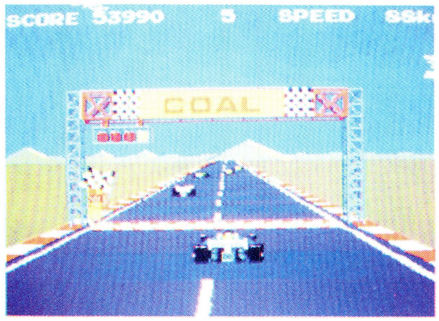
Koichi Tashiro (left), Noby Kasahara (centre) and Youichi Haraguchi talked to Edge about *Ridge Racer*, PS-X and more

Of course, one of the principal topics of conversation at Namco is the stupendous *Ridge Racer*. For anyone who hasn't yet seen the game, *Ridge Racer* is the pinnacle of the 3D driving game genre, delivering the best polygon graphics in the business. According to **Koichi Tashiro**, general manager of the computer graphics development department, it took a team of 40 programmers, designers, and musicians a year to develop the game. 'Of course, the hardware – System 22 – took much longer than that,' explains Tashiro, 'but it wasn't developed from scratch – we built on the techniques used to create our previous polygoniser, System 21 [as used in *Winning Run* and *Starblade*, amongst others] and also →

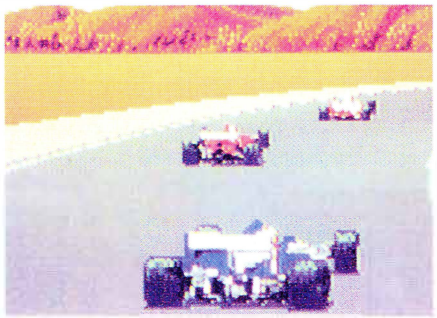
Namco's new baby, *Ridge Racer* (below). Its polygon technology was first seen in *Winning Run* and *Driver's Eyes* (bottom left and right)



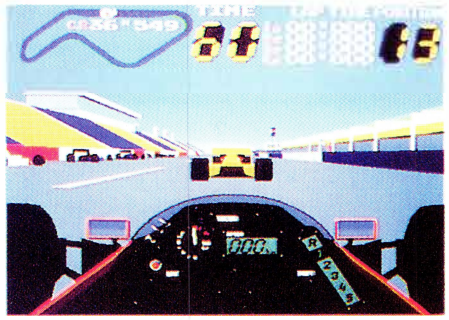




One of the most influential racing games of our time, *Pole Position*. In 1982, this was a significant step forward in 3D coin-op graphics



Five years later came the hugely successful *Final Lap*, followed by three more versions. Link-up is the secret to all the best racers



In 1990 *Winning Run* delivered the fastest, smoothest polygons this side of *Virtua Racing*. And the hydraulic cabinet was a bit special too

← employed techniques used to develop hardware that hasn't actually seen the light of day yet.'

As revealed in **Edge** 6, *Ridge Racer* is based on a 32bit CG (computer graphics) board incorporating Namco's custom TR³ polygon generator – a realtime texture-mapping, visual rendering system. Similar to Sega's new Model 2 CG board, System 22 has super high-speed calculation and drawing functions, but also supports full texture-mapping, Gouraud shading and depth-cueing for every polygon onscreen. It's mightily impressive stuff and, as Tashiro explains, represents a significant technological advance over other coin-op hardware: 'We developed the System 21 Polygonizer in 1989 for games like *Winning Run* and *Solvalou*, 'and although we're still using versions of that hardware in recent games like *Air Combat* and *Cyber Sled*, not only does it rely on a 16bit CPU but it lacks the texture-mapping and high-speed geometry of System 22. In terms of polygons it's capable of handling 1000 polygons every 1/60 second, whereas System 22 can handle 4000 every 1/60 second. Basically, we've improved the engine geometry by 10 times in System 22, making it possible to generate 240,000 polygons a second, compared to 60,000 a second on System 21.' But exactly what kind of kit are we talking about here? Parallel processing? Digital signal processing? Unfortunately, Namco aren't particularly keen to discuss specific details about their hardware, but they are prepared to tell us that 'the architecture is very similar to that of a graphic workstation, but with an emphasis on realtime response, so there is direct feedback for the player.' (A quality that keen **Edge** readers will notice is shared by Sony's PS-X, incidentally.)

And the CPU? 'The CPU isn't that fast on its own, but it doesn't need to be. It's a 32bit Motorola 68020 running at 25MHz, but it has digital signal processing, using Texas Instruments 320TI DSPs.' This goes some way to explain how it manages to calculate over 400 million FLOPS (floating-point operations per second). As far as display is concerned, 'the game operates in a 640x480 interlaced resolution and uses 30,000 colours onscreen at once, despite being capable of showing all 16.7 million. The video code is 24bit, but it doesn't use an Alpha Channel.'

'We think we can make a 100% translation of *Ridge Racer* to the PS-X'
Youichi Haraguchi, Namco

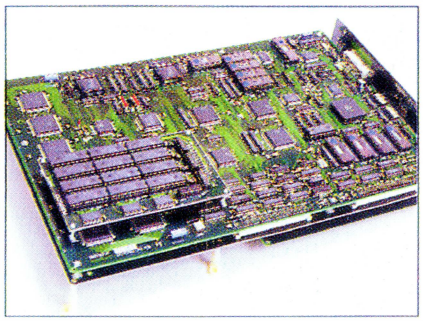
The amount of memory a graphically intensive game like this eats up is huge; while plain polygons normally take up very little room, highly textured and shaded polygons are notoriously byte-hungry. And in the same way that the texture-mapped PC game *Strike Commander* chomps a big chunk out of a hard drive, *Ridge Racer* requires a stack of ROM chips to make it run. 'Graphics, sound and code take up between 150 and 160 megabits [around 20 megabytes],' reckons Tashiro, 'although we didn't arrive at a specific figure. The detailed textures take up a lot of space.' (The textures were rendered, like most of the graphics, using SoftImage's *Explorer* package on Silicon Graphics hardware.)

With Sega in the process of introducing a potential rival for *Ridge Racer* in the form of *Daytona GP*, how do Namco rate their main rivals in the coin-op market? 'In terms of hardware technology we think we are one year ahead of Sega,' says **Noby Kasahara**, section chief of international sales. 'Their finished game hasn't been released yet, but personally, we think System 22 performs better.' And the latest version of *Daytona USA* seen at the Japanese AOU show, although brilliant, bears him out. So, if Sega holds no fear for Namco, does Nintendo's Project Reality hardware pose a threat? Not directly, in their eyes: 'We think they will not make any hardware for the arcade, but will simply license the technology to other companies.'

But Namco aren't just dedicated to making big, expensive coin-ops. Last November, they signed an agreement with Sony to develop software for their powerful new PS-X home system, scheduled for release in December. (In return, Namco will use PS-X hardware for future arcade projects.) Their first PS-X game will, unsurprisingly, be *Ridge Racer*. However, **Youichi Haraguchi**, a general manager in Namco's consumer (console) division, can't confirm whether the PS-X version will be exactly the same as the coin-op: 'Not all of the development tools have been delivered by Sony yet, and we need to see what they can provide us before we start any proper work. But given the power of Sony's hardware, we don't think it will be that difficult to convert, and we should be able to do it in the time we have. Technically, we believe we can make a 100% translation.' →

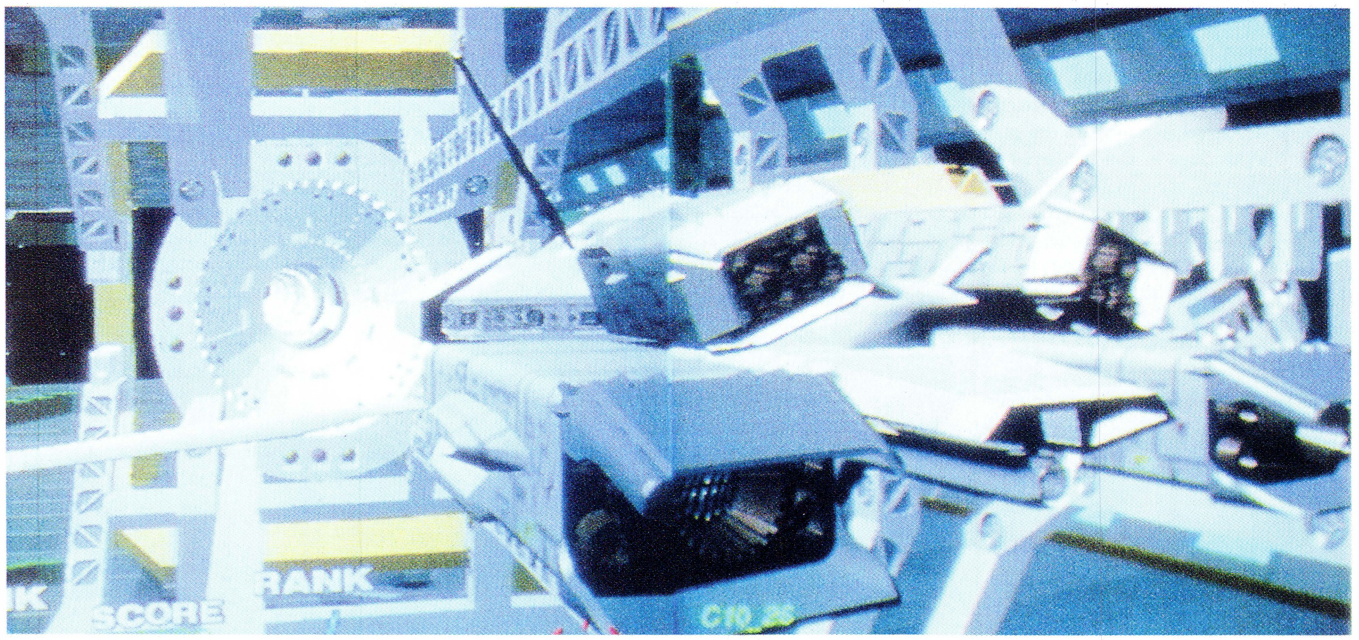
To discourage Edge from wandering around taking unapproved photographs, Namco kindly laid on transport to the station

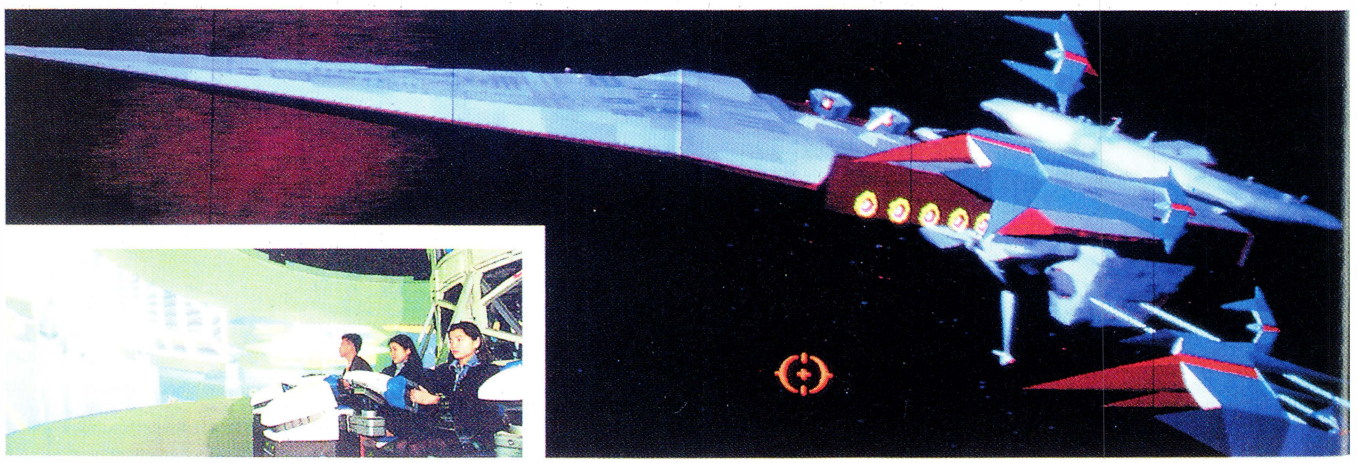
Inside R&D: from left to right, Koichi Tashiro (CG development dept), Noby Kasahara and Youichi Haraguchi (consumer sales)



The System 22 board includes a piggy-back 160 megabit ROM board that conveniently obscures Namco's custom graphics processor

Namco's gratuitously lavish *Galaxian*³ combines background images pulled off LaserDisc with realtime foreground sprites





← But surely the existence of a home system with the ability to emulate a state of the art coin-op is not exactly good news for an company with a huge investment the arcade business? Haraguchi seems unperturbed: 'We're not worried about this because by the time we have *Ridge Racer* ready for the PS-X – maybe in 10 or 12 months' time – we'll have moved on with our arcade games to even more exciting things. Currently we are trying to improve System 22 to provide even greater performance, but we are also working on other technologies.'

And Namco have plans for other console formats, too. While existing development focuses on formats like the SNES and PC Engine, the company naturally regards its future as lying with 32bit systems. **Noby Kasahara**, section chief of international sales, says: 'We are confident about Sega's Saturn and Sony's PS-X, but we're still unclear about the specifications of some machines, so we do not know their exact performance. We'll try to develop software for all the next-generation machines, but we'll probably eventually focus on one. Currently we are undecided only about NEC's FX, but machines like 3DO are risky too. Nobody knows just how successful 3DO can be and we don't think it will be an easy platform for us. We'll continue our development on the machine, but we can't honestly say we expect to make a profit on 3DO in Japan.' But whichever format prevails, Namco's increasing commitment to the consumer market should provide them with something to fall back on if the the coin-op industry suffers any serious downturns in the future.

Namco's involvement in the console sector didn't start with PS-X, however; it began in 1978 with the licensing of coin-op games like *Pac-Man* to companies such as Atari and Bally Midway, But the big crash of 1983 – in which Atari anticipated huge market growth and manufactured more copies of *Pac-Man* for their VCS machine than there were players! – left the industry in complete disarray.

In 1984 Namco were given an unprecedented opportunity to develop software for the Famicom (the Japanese NES). No company had previously been allowed to produce software for Nintendo, but Nintendo president Hiroshi Yamauchi chose to bestow this honour on Namco. Nakamura's company immediately profited from the explosion in the Japanese Famicom market: so vibrant was the new 8bit format that the Famicom conversion of *Xevious* sold a staggering (for the time) 1.5million copies, which alone provided Namco with enough cash to buy an entire office block. This has since been nicknamed the 'Xevious building'.

'We can't honestly say we expect to make a profit on 3DO in Japan'
Noby Kasahara, Namco

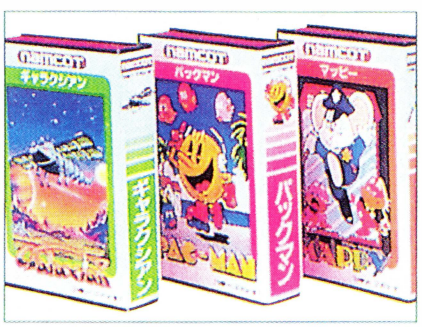
Unfortunately, Namco's special relationship with Nintendo came to an abrupt end five years later when the Nintendo contract expired. Nakamura had expected the association to be cemented with a renewal of the agreement but instead, Nintendo relegated Namco to the standard terms accepted by all their subsequent licensees, and a furious Nakamura committed commercial suicide by speaking out against the all-powerful Nintendo. After a failed lawsuit, in which Namco accused Nintendo of monopolistic practices, Nakamura found himself in the unenviable position of having to crawl back to Yamauchi to accept the terms, with all the privileges previously enjoyed by the company withdrawn.

Namco had to acknowledge the fact that without Nintendo they could not survive; by this time 40% of their business depended on Nintendo, and despite contracts with Sega and NEC for developing Mega Drive and PC Engine software, Namco's destiny in the home videogame industry lay at the feet of Nintendo and their 95% stranglehold on the market. Of course, a Namco home machine was always anticipated – plans existed for an number of years; however with Matsushita, Sanyo and now Sony entering the console market, Namco have decided that there simply isn't room.

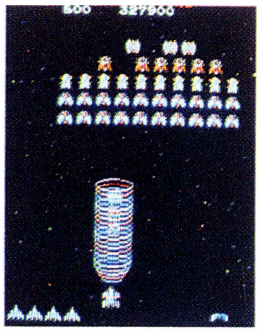
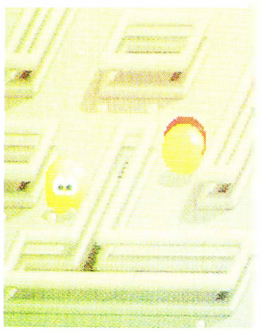
It was in 1972 that Namco's interest in the coin-operated videogames market began. Atari's Japanese subsidiary had been suffering heavy losses in Japan, and several coin-op companies, including Sega (who manufactured pinball tables and jukeboxes), expressed an interest in buying it. Nakamura saw a great future in the company and regarded it as a way to get out of amusement rides, and while figures of around $50,000 were bid by most companies, including Sega, Nakamura offered an outrageously high $800,000. His decision proved a wise one: subsequent →

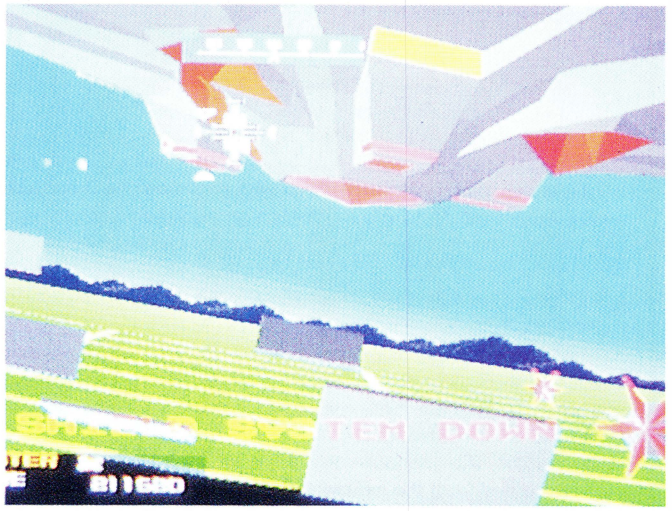
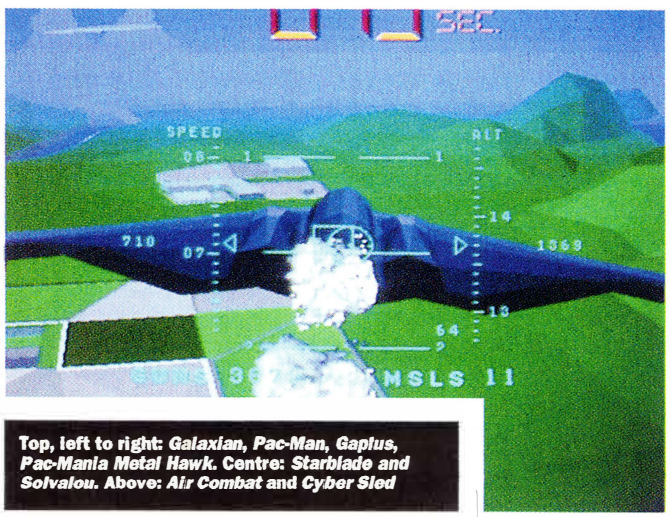
One of Namco's three buildings – their corporate headquarters was entirely funded by the profit from *Xevious* on the Famicom

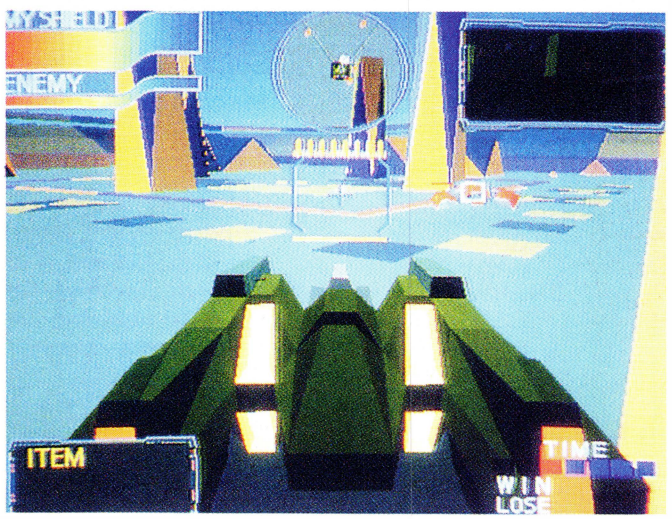
Namco's chairman and CEO, Masaya Nakamura, is also president of the JAMMA coin-op trade association in Japan



Namco's first big Famicom sellers included the likes of *Galaga*, *Pac-Man* and *Mappy*. Those golden days didn't last long, though



Top, left to right: *Galaxian*, *Pac-Man*, *Gaplus*, *Pac-Mania* *Metal Hawk*. Centre: *Starblade* and *Solvalou*. Above: *Air Combat* and *Cyber Sled*

Namco's game history

Oct	'79	Galaxian	Mar	'85	Dig Dug II	Jul	'89	Dirt Fox	Sep	'92	Final Lap 3
Feb	'80	Navarone	May	'85	Metro-Cross	Nov	'89	Burning Force	Nov	'92	Cosmo Gang: The Puzzle
Feb	'80	SOS	Dec	'85	Sky Kid	Nov	'89	Four Trax	Dec	'92	Exvania
July	'80	Pac-Man	Dec	'86	Rolling Thunder	Dec	'89	Dangerous Seed	Feb	'93	Galaxian^3 (6-player)
Jan	'81	Rally-X	Apr	'87	Shadow land	Feb	'90	Marvel Land	Feb	'93	Super World Court
July	'81	Warp & Warp	Jun	'87	Dragon Spirit	Aug	'90	Final Lap 2	Mar	'93	Knuckle Heads
Sep	'81	Galaga	Nov	'87	Pac-Mania	Dec	'90	Dragon Saber	Apr	'93	Lucky & Wild
Nov	'81	Bosconian	Dec	'87	Galaga '88	Feb	'91	Driver's Eyes	Jul	'93	Air Combat
Mar	'82	Dig Dug	Apr	'88	Assault	Mar	'91	Rolling Thunder 2	Sep	'93	Cyber Sled
Sep	'82	Pole Position	Sep	'88	Ordyne	Mar	'91	Steel Gunner	Sep	'93	Numan Athletics
Sep	'82	Super Pac-Man	Oct	'88	Metal Hawk	Sep	'91	Starblade	Oct	'93	Ridge Racer
Feb	'83	Xevious	Oct	'88	World Court	Dec	'91	Solvalou	Nov	'93	Suzuka 8 Hours 2
Oct	'83	Pole Position II	Nov	'88	Splatterhouse	Mar	92	Steel Gunner 2	Feb	'94	Final Lap R
Apr	'84	Gaplus	Feb	'89	Phelios	Mar	'92	Cosmo Gang: The Video	Feb	'94	Tinkle Pit
Aug	'84	Pac-Land	Feb	'89	Winning Run	May	'92	Suzuka 8 Hours	Feb	'94	Nebulas Ray

← international sales increased 100-fold, fuelling Namco's growth.

Since 1978 Namco have produced more than 120 coin-ops. Their first foray into the market was the lightgun clay pigeon shooting game, *Shoot Away* – these machines can still be found in older seaside arcades. However, it was the 1979 game *Galaxian*, with its colourful graphics, that most gamers will remember; injecting skilful gameplay into the overpopulated space invaders market, *Galaxian* was a huge success, and follow-ups like *Galaga* and *Gaplus* gained similar cult followings.

But the game that propelled Namco to the forefront of the coin-op scene was *Pac-Man*, in 1980. The initial game series reputedly brought in hundreds of millions of dollars for the company. This was the second big craze the videogame industry had seen after *Space Invaders*, and it was also a game that Atari converted for their VCS console. According to David Sheff's book, Game Over, Nakamura awarded the game's designer just $3,500 for his achievement; needless the say, the man in question left the videogame industry in disgust shortly afterwards.

Throughout the mid-1980s, Namco continued to release quality arcade games and coin-ops. Games like *Pole Position*, *Pole Position II*, *Pac-Land*, *Metro-Cross*, *The Tower Of Druaga* (which proved a massive hit on the Famicom) and *Rolling Thunder* continued to rake in the coins, providing Namco with enormous R&D budgets for future hardware development. The first fruits of this investment were *Assault* and *Metal Hawk*. Neither game was a big commercial success, but no-one could deny the technical excellence on display. For the first time an arcade game had fullscreen background and sprite rotation, seen later (in less impressive form) in the helicopter sections in SNES *Pilotwings*. *Metal Hawk* was particularly impressive with its rotation and scaling of huge sprites, but the high cost of the units prevented it from being widely distributed.

Namco's revolutionary coin-op hardware even made it into standard PCBs like *Ordyne*, complete with brilliant rotation, but by the late '80s they had set their eyes on the future of computer graphics: polygons. *Winning Run* was released in early 1989 and was the first coin-op driving simulator to include dedicated polygon generation (Atari's *Hard Drivin'* was primarily PC-based). *Winning Run*, which relied on Namco's System 21 Polygonizer, was a huge advance over conventional 3D graphics performance. Again, the high price of the unit (boosted by one of the best sit-in hydraulic cabinets around) meant that *Winning Run* didn't get off to a good start compared to the spectacularly successful *Final Lap* coin-op, which had appeared a year previously. *Final Lap* used cheaper conventional sprite technology but allowed arcade owners to link up to eight units together for great multiplayer racing. *Final Lap 2* and *3* continued the family line.

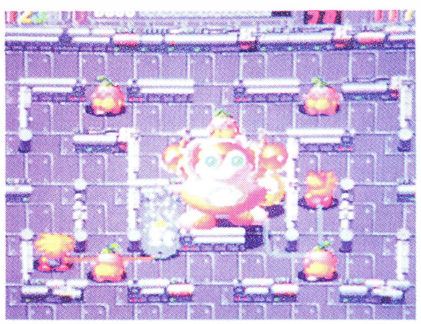
Pac-Man propelled the company to the forefront of the coin-op scene

System 21 was put to the test in later coin-ops. These included another version of *Winning Run*, *Winning Run Suzuka GP* (it failed to make it to the UK); the initial singleplayer version of *Galaxian³*; *Driver's Eyes* (a threescreen game similar to *Winning Run*, although more jerky); *Starblade* (the game that inspired *StarFox*, with LaserDisc backdrops); *Solvalou* (the sequel to *Xevious*, employing smooth realtime backdrops); and more recent additions like *Air Combat* and *Cyber Sled*.

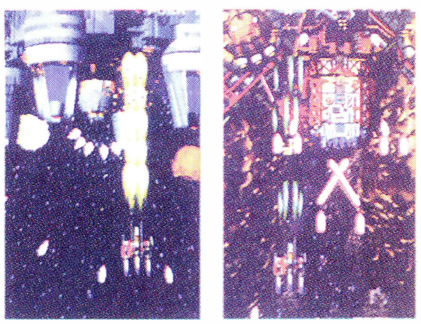
So where do Namco see the coin-op market going? 'For us,' says Noby Kasahara, 'the future of the coin-op market lies just as much with true computer graphics, as in commercial movies like *Jurassic Park* and *Terminator 2*, as it does with realtime images. Of course, there are also possibilities to increase the number of polygons, and develop antialiasing techniques – these are the technologies we are aiming to develop.' Namco are also expanding their theme park business; the company's Tokyo Wonder Eggs park will soon be joined by the Magic Edge Entertainment Center in California, funded by Namco and stocked exclusively with their latest hardware – including the *Hornet 1* VR system, a flight simulator powered by Silicon Graphics technology and developed with computer graphics pioneers Evans & Sutherland.

The big question over Namco's future is whether the company will sideline its coin-op business and concentrate on the console market as hardware performance increases. The signing of the PS-X deal has shown the company willing to play a part in the 32bit console revolution; with the hitherto dominant Nintendo looking increasingly marginalised, perhaps the way is now clear for a Sony/Namco partnership to take the console sector by storm. E

Final Lap R **is Namco's latest addition to the multiplayer series. This game made its debut at the AOU Show (see news report)**



Tinkle Pit **marks Namco's commitment to cute character games. Games like this have boosted female arcade attendance in Japan**

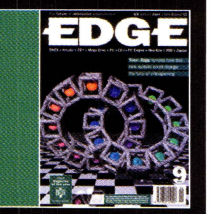


Nebulas Ray **is a welcome return to the dated but enjoyable vertical shoot 'em up, boosted in this case by some exquisite graphics**

Sega Saturn makes its debut, **page 6**... First screenshots of **PS-X** games, **page 8**... **TAOS:** the operating system that could change everything, **page 10**... **ECTS:** show report, **page 14**... **CSG:** show report, page 16... New **Acorn** PC-compatible machine, **page 18**

Cutting Edge

The very latest **news** from across the entire world of videogaming



Sega's new hardware finally becomes real (well, barring last-minute tweaks to the case design, and name, and possibly other things, too). Our interest is also piqued by the Saturn translation of Yu Suzuki's new fighting game, whose combat system offers an "infinite variation" of actions. This one could be a cult hit...

Saturn shows its true **colours**

Despite rumours that Saturn is outclassed by the PS-X, Sega are forging ahead; the Japanese press recently got their first look at the machine

***Daytona USA*, as it will be known over here. But will Saturn be powerful enough to do it justice?**

Hugely desirable kit: in true Japanese style, Sega paid great attention to the design of Saturn, resulting in unrivalled must-have appeal. Atari and Commodore take note...

Hiroshi 'Yu' Suzuki talks freely about his work on *Virtua Fighters* for the Saturn

After months of carefully timed mumblings and prudent rationing of game screenshots, Sega Enterprises have finally got around to showing a mock-up of their Saturn console to the fervent Japanese games press. Pictures of the console were distributed to Japanese magazines, while at the same time a Japanese television channel was permitted to give its viewers an early glimpse of the system, as well as one of its games.

The design of the unit comes as a surprise to those expecting the system to be purely CD-based – at the rear of the machine a cartridge slot is clearly visible. However, Sega are adamant that this is a prototype model (made out of wood, incidentally), and by no means the finished unit; changes, whether big or small, could still be →

Virtua Fighters: in development

Sega's coin-op maestro, Yu Suzuki, is also the producer of *Virtua Fighters* for Saturn. This is what he had to say about the game in the Saturn press brochure distributed at the CSG show in Tokyo.

The life of the game, above all the movements and skills of the characters, are all going →

SATURN

Sega's CSG show flyer not only sported the new Saturn logo but included familiar Edge shots of forthcoming Saturn games

Saturn's switchgear (left to right): power on/off, CD lid release and reset button

← to be included. We have plans to make a complete adaptation of all the movements and skills. On the other hand, there will be a reduction in the number of polygons compared to the coin-op.

There are about 700 motions in the arcade version and we make up the actions of the characters from this. There is in effect an infinite variation. We hope to reproduce all of these.

All the characters are the same. Each of the eight individuals has fans and we take this very seriously. We hope to faithfully reproduce the movement of their feet, knees, hands, arms.

In the arcade versions there are the limits imposed by time and profitability. At home you can play for as long as you want. As a software writer, that means a different kind of enjoyment and I am very happy to be involved with both versions.

← made, and even the 'Saturn' product name is still, in Sega's words, 'provisional'. Whatever the case, in opting for the classy champagne-grey finish found on some top-end VCRs and camcorders, Sega have ensured that Saturn has the makings of a classic piece of hardware design.

The Sega PR division responsible for Saturn played only a minor role at the recent CSG show in Ikebukuro (see page 16). Saturn was low on the Sega agenda, but nevertheless, to keep the general enthusiasm in check, the company distributed a brochure which gave details of the first wave of titles for the platform and contained comments by AM2's Yu Suzuki about the Saturn conversion of *Virtua Fighters* (see translation opposite). The other Saturn games listed inside the brochure were *Daytona GP* and the three unnamed original titles seen in **Edge** 6,7 and 8.

Further Japanese interest in Saturn was generated by a recent Japanese television programme devoted to Sega. 'Special New' (TBS Channel 6) showed Sega's president, Mr Nakayama, at his recent 61st birthday party, held at the AOU. Nakayama's visit to the Las Vegas CES in January was also closely monitored by the media, before attention switched to Japan, where TV journalists were given access to Sega's consumer (console) R&D labs. Here, Nakayama unwrapped the wooden mock-up of Saturn while a commentator talked about Sega's more general plans for the future. This sneak preview of the system culminated in a demonstration of a working version of *Virtua Fighters*.

What is it?

It claims to be the world's fastest VR system. It is able to render five million Gouraud-shaded triangles/second and four million phong-shaded triangles/second with spectacular lighting and photo-texturing

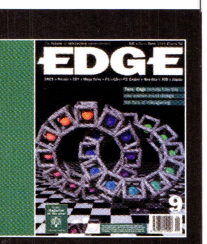
Despite the excitement

about Saturn, Sega must be concerned by Sony's plans to launch their own machine at around the same time, now that PS-X is causing a stir in the higher reaches of the Japanese games community. Both companies have prestigious thirdparty developers like Capcom, Konami and Namco on their team, but the consensus is that Sony still have a considerable edge with their technology. Saturn might include three custom Hitachi-designed processors in an effort to catch up, but many pundits are nevertheless convinced that Sega will delay their system to prevent being usurped in the hardware hierarchy.

Sony's plans to launch at the same time must be a major concern for Sega, now that PS-X is causing a stir

However, Sega are still claiming that Saturn's official launchpad will be the Tokyo Toy Show this June. One ticket to Tokyo, please... E

Japanese viewers of the Special New programme recently caught their first glimpse of Saturn. Sega president Hayao Nakayama showed the prototype unit (left), before its sleek design was revealed in close-up (middle), followed by an indication of what the machine was capable of (right)



Finally someone comes out and says it: "If it's not realtime, it's not a game". The man behind the claim: Akira Sato, director of SCE Japan, whose upcoming PS-X, it's feared, may suffer from a limited number of game releases in the months following release. The plan is to spend time making 'special' games, not flood the market.

Sony PS-X gets first screening

Sony show the Japanese public what their system is capable of

it is...

Division's Pixel Planes 6 virtual reality system, a high-performance image generation system developed by the University Of North Carolina. An entry-level system will cost the VR fan a mere $200,000

After a long period of reticence, Sony have finally revealed an initial brief for the European and US launch of their breathtakingly potent PS-X games system. The console, which is on schedule to hit Japanese homes in November this year, won't be making an appearance in Europe or the US until 1995 – probably September.

Delaying the launch of the machine in Europe and the US could be a wise move on Sony's part. As 3DO, Jaguar and perhaps even the Mega Drive 32 try to force their way into the UK games market over the next 12 months, Sony have a 15-month development window which they can use to help their line-up of top thirdparty developers to compile a library of at least 20 quality software titles which will be available at launch in Europe and the US.

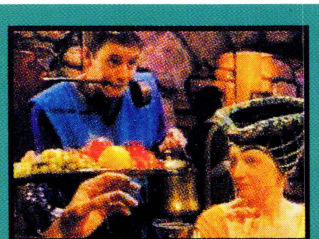
Of course, when the machine is launched in Japan this autumn it will have to survive without this software back-up, although five titles per month have been promised. Sony remain unconcerned: 'I don't think this is a numbers game,' claims **Akira Sato**, director of Sony Computer Entertainment in Japan. 'Rather than providing a huge choice, we have to make the kind of impact that convinces the consumer that software that exploits PS-X really is something special. If it's not realtime, it's not a game.' Hardware has a tradition of debuting in Japan without a proper →

An image from the PS-X game *Legend* – part of a Japanese TV demo illustrating the incredible realtime polygon power of Sony's machine

Turning the platform game on its head – literally – this PS-X demo showed how such a game could work with 3D polygons

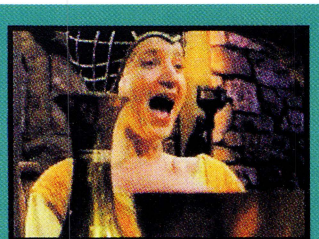
Attract mode

Once again, Edge takes time out to enjoy one of the better game intros around. This month, Crystal Dynamics' medieval hack 'n' slash game on the 3DO, *The Horde*, has the distinction of being chosen for Attract Mode. (Check out Testscreen on page 70.)

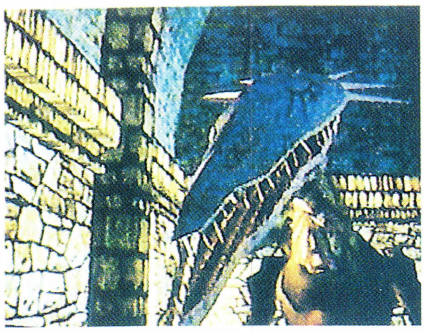


1 The hero of the game, Chauncey, a servant in the royal household, enters the great hall where the King is holding a banquet. Laughter fills the air as he begins his duties

2 Whilst Chauncey waits on the tables, the evil High Chancellor tells the assembled guests about a land far away, where hordes of monsters eat the local villagers



3 The Chancellor's horrifying story does little to worry the guests, who by this time are quite merry. In fact, they find the tale very amusing and begin to roar with laughter



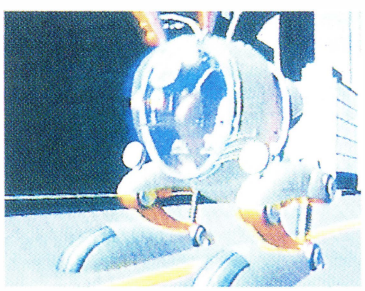
Telebi Asahi's popular late night TV show, Tonight, on Channel 10, gave Japanese viewers an early glimpse of the Sony PS-X in action, with a stunning trip through the textured passages of a dungeon in *Legend*. The broadcast's midnight timeslot prevented younger players from getting too excited

'We have to convince the consumer that software that exploits PS-X really is something special. If it's not realtime it's not a game'

Akira Sato, director of Sony Computer Entertainment, Japan

← catalogue of software. The end of 1990, when Nintendo sold over a million Super Famicoms, despite there being just two (admittedly great) titles available for it, must surely be a comforting memory for Sony.

Japanese TV viewers recently got a taste of PS-X performance on Telebi Asashi's midnight Channel 10 show, Tonight, which usually concentrates on topics such as hot new Tokyo nightspots rather than cutting-edge games hardware. But with the Japanese games industry on the brink of its fiercest rivalry to date, the media spotlight on the games market has intensified by several megawatts; Tonight featured not only PS-X demos but also NEC's FX in action.



The poor quality of this TV image belies PS-X's potent rendering power. 60fps is no problem for the system

Legend was one of the PS-X demos which appeared on the show. Featuring some astonishing realtime polygons, the TV demo took a path down a highly detailed and textured dungeon before coming face to face with an enormous animated dragon. The execution of this realtime demo was incredible.

As detailed in **Edge** 5 and 6, PS-X can manipulate incredibly complex texture-mapped polygons in realtime at 60fps – just like Namco's *Ridge Racer* and Sega's *Daytona USA* coin-ops – besides offering unprecedented 2D sprite power. (Indeed, the interview with Namco in last month's **Edge** revealed that PS-X *Ridge Racer* will be *identical* to the arcade version.)

With Capcom, Konami, Namco and, of course, Sony and Psygnosis spearheading the development of PS-X software, the future for Sony's console looks formidable. The latest rumour is that November's launch will see the PS-X launched at a fiercely competitive ¥30,000 (£200). The official name of the system (Sony GameMan, perhaps?) will be announced shortly. Importers, take your positions...

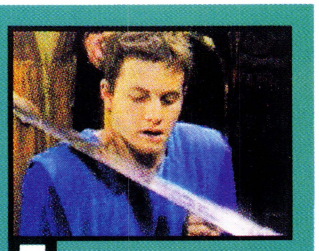
Nintendo ignored?

Nintendo, the company with a 90% share of the videogames industry in Japan, have been relegated to the sidelines in the current hardware race, and it's Saturn and PS-X that are grabbing all the headlines. With Project Reality still some way off, loyal Nintendo licensees like Capcom and Konami are placing Sony's PS-X and (to a lesser extent) Sega's Saturn clearly ahead in the race to the next level. Could Sony oust Nintendo from their long-term domination of the industry? Some industry pundits seem to think it's going to happen.

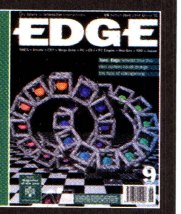
4 The King laughs so hard that he starts to choke on a piece of food, clutching his throat as he fights for breath. But no-one, it seems, has noticed his struggle

5 The guests carry on laughing and the Chancellor continues to tell his story. Chauncey is the only person to notice that the King is actually fighting for his life

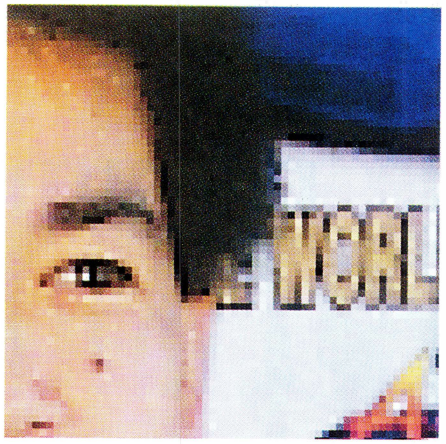
6 Chauncey valiantly leaps to the King's aid. But Chauncey's sudden movements alert the Chancellor, who thinks that the servant is actually attacking the King

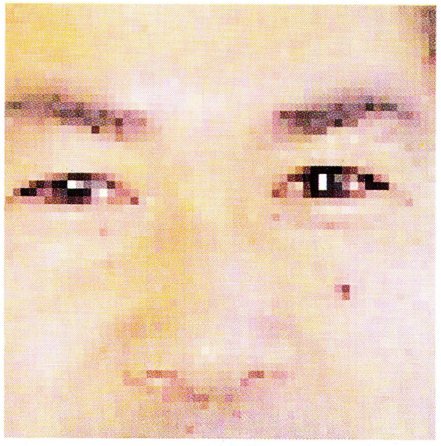


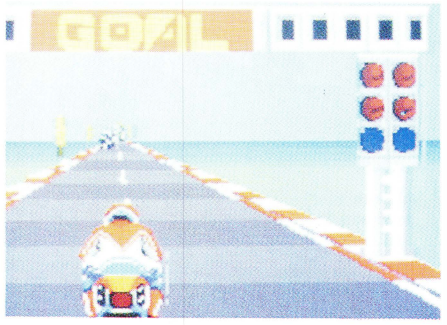
7 Chauncey dislodges the food from the King's throat. The King is so grateful he knights Chauncey and hands over his mighty sword, 'Grimthwacker'. Game on...

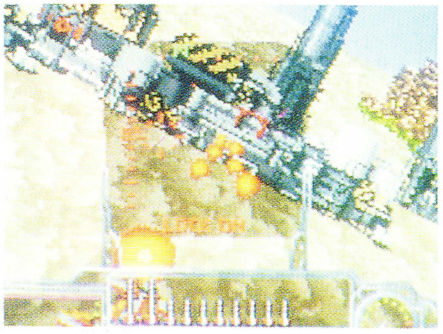


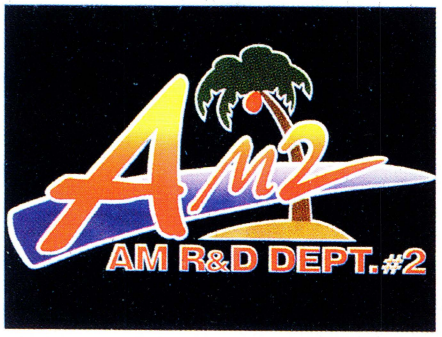
Sega's leading coin-op light opens the doors of AM2, home of *Virtua Racing* and, now, *Daytona*. With 100 staff (out of 600 dedicated to Sega arcade development), it's the largest team of its type in the world, and, here, its main man talks polys, processing, and squeezing a leading-edge coin-op into a Mega Drive-sized pot.

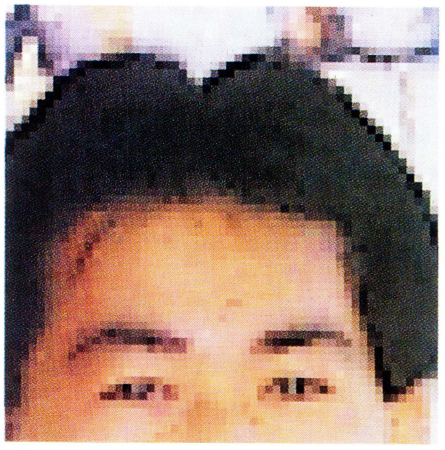


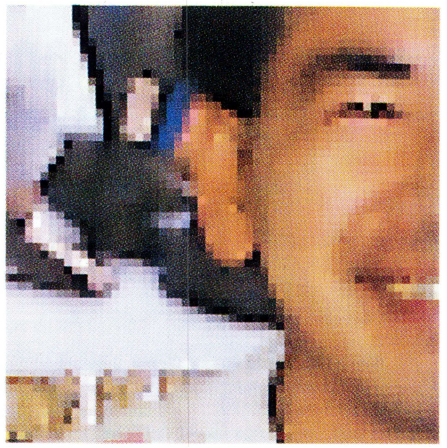












鈴木 裕

Yu Suzuki: Sega's driving force

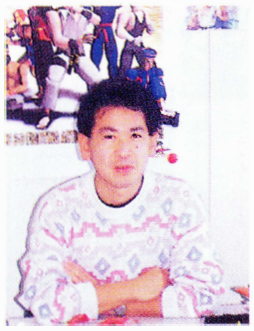
Sega's amusement division is located in Ohta-ku, Tokyo

Yu Suzuki is the legendary head of AM2, Sega's core coin-op R&D operation. **Edge** gained access to AM2's Tokyo base to meet the talent behind some of the greatest Sega coin-ops ever

Yu Suzuki is Sega's undisputed coin-op champion. Since joining the company 11 years ago, he has been the guiding force behind Sega's biggest coin-op successes. Some of the most influential games of the past decade, from early sprite scalers like *Hang On* and *Out Run* to the polygon-packed excesses of *Virtua Racing* and *Virtua Fighters*, have been produced under his auspices. His latest, and potentially greatest, creation is *Daytona GP*, a game that represents the apex of Sega's 3D polygon technology.

Edge was fortunate enough to be invited to Sega's amusement (coin-op) division to see the finished game in action and talk to Mr Suzuki.

Edge How many people work in AM2, and how is Sega's amusement division structured?



Yu Suzuki: his status as coin-op guru is unrivalled

Yu Suzuki Sega have around 600 people working in the amusement division and AM2 is just one part of that. Around 100 people collectively form what's now known as AM2. We're basically just a large team. Originally, there was only one department, but the advent of proper CG technology meant our resources had to be channelled in different directions.

Edge What other games has AM2 been responsible for?

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YS *Virtua Racing* was the first game we produced, but after we finished that we split AM2 into two departments – one team worked on *Virtua Fighters* while the other concentrated on *Daytona GP*. Of course, there are many staff here, including myself, who have worked on a great many of Sega's other arcade games, and on Sega's arcade hardware, such as System 24 and 32.

Edge When you started at Sega, were you able to choose the department you worked in?
YS Yes, I'd say 80% of the people who work here get to choose the area they're interested in. When I started in 1983 there was only one division – the amusement [coin-op] division – so I didn't have to make a choice. In this division we've always been spoilt with big screens and high performance hardware – the games we design simply aren't restricted by hardware like they are in the home. I wouldn't want to give that up for the consumer [console] division.

Edge But AM2 recently converted *Virtua Racing* to the Mega Drive?
YS Yes, but mainly because the SVP chip meant it wasn't an over-complicated conversion. Without it, I don't think I would have even attempted it. Of course, with the introduction of Saturn and, in Europe, the Mega Drive 32, the crossover between the consumer and amusement divisions will be greater because the hardware is catching up with the technology we're using for the arcade.

Edge How many people did it take to produce the original *Virtua Racing* game?
YS Actually, it changed a lot. When we first started on the project we had about 10 people and by the end we had 25. I guess the average number was around 20 people working flat out for a year. That's just for the development of the actual game, though; the actual hardware – Model 1 – took longer.

Edge Model 1 was a big step forward at the time, wasn't it?
YS Yes, it took three years to develop, whereas new graphics hardware usually takes a period of about 12 months.

Edge So what's so special about the technology?
YS Well, when we first showed a prototype of *Virtua Racing*, most people thought it used parallel processing. They were surprised to find out that it's actually a sequential processing board.

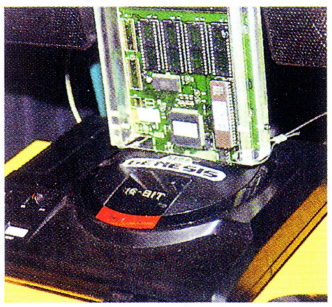
Edge What kind of central processor does it use?
It's a 32bit RISC chip [the NEC V60] and at 16MHz it's actually pretty slow, executing just 2.5MIPS. Just one of the CPUs inside Saturn delivers 25MIPS!

Edge How does Model 1 handle so much maths, then?
YS The graphics engine relies on high-speed digital signal processing, in a similar way to the Mega Drive cartridge, but on a much larger scale. There are four Fujitsu serial DSPs, as well as a high speed co-processor. There's also a processor for the background scrolling behind the polygons.

Edge You've restricted the Mega Drive game to just 16 colours. How many colours does the original game display?
YS The game runs in 24bit colour [16.7 million], with 16bit-colour [32,000] backgrounds. There's also an 8bit Alpha channel. The biggest difference is probably the resolution of the vectors: Model 1 and 2 were designed for a high screen resolution of 496x384 – almost twice the Mega Drive's.

Edge What about the polygon count. How does it compare to the Mega Drive version?
YS Model 1 was designed to calculate 180,000 a second, whereas the Mega Drive copes with between 3,000-5,000! In the coin-op version of *Virtua Racing*, the speed rarely drops below 30 frames per second. That means there are about 6,000 polygons every frame, compared to the 300-500 per frame on the Mega Drive, which runs at under half that – about 12-15fps.

'Cars have always been a big hobby of mine, and I've just been lucky that racing games are always in vogue'



Sega's SVP chip, as used in *Virtua Racing* on the Mega Drive

Edge What software was used to model the 3D polygons in *Virtua Racing* and *Virtua Fighters*?
YS We're pretty familiar with SoftImage's packages for Silicon Graphics, and their modelling software was used for the polygons in both games. We've also used SoftImage's *Flock Of Birds* motion capture system for the animation in *Virtua Fighters*.

Edge We've noticed that the graphics in *Virtua Fighters* seem less detailed than those in *Virtua Racing*, particularly the backgrounds. Doesn't the game use the same CG board – Model 1?
YS Yes it does, but we doubled the frame rate in *Virtua Fighters* because fighting games require a faster response.
[Twice the frame rate means half the number of polygons that can be displayed simultaneously.]

Edge You've produced a lot of racing games. Why is that?
YS Cars have always been a big hobby of mine, and I suppose I'm just lucky that racing games always seem to be in vogue. For *Virtua Racing* I did some research into the 1992 Ferrari and MacLaren-Honda engines, and spoke to drivers and engineers, as well as hiring a Honda NSX for a period. The finished game includes around 120 parameters, including air density, slipstreams, aerodynamics, etc, of which I'd say around 20-30 really matter. I like the way racing games can throw the body around too, such as the deluxe versions of *Daytona* and *Virtua Racing*.

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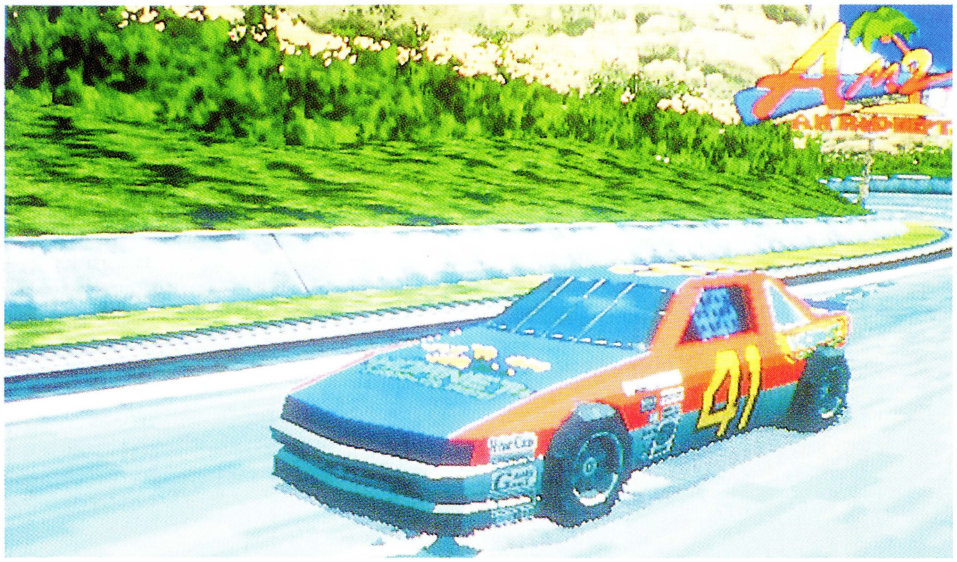
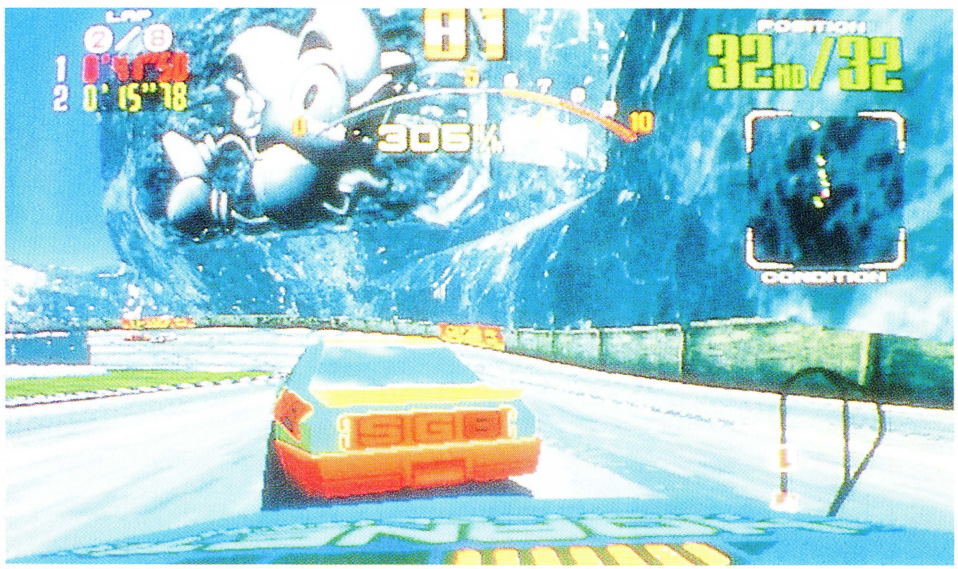
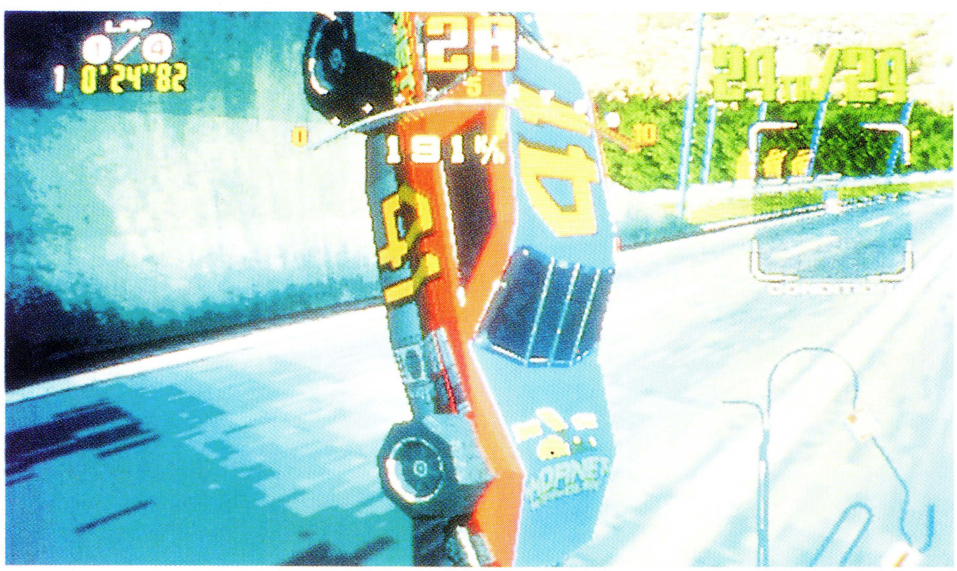






***Daytona GP* (left and above), Sega's first phase of texture-mapped 3D. The finished game was unveiled at the Japanese AOU show**

Model 2 tech specs

CPU: 32bit RISC @ 25MHz

Co-processors: 32bit @ 16 MFLOPS
3D matrix

Memory: 8Mbits RAM
Up to 248Mbits ROM
(*Daytona* uses 178Mbits of ROM)

3D graphics engine:
900,000 vectors/sec
300,000 polygons/sec
Features:
Flat shading
Texture mapping
Micro-texture
Multi-window
Spread reflection mode
Mirror reflection mode

Polygons: 120 million pixels/sec
65,536 colours
(1024-colour palette)

Screen: 496x384
Medium resolution
Horizontal frequency 24MHz

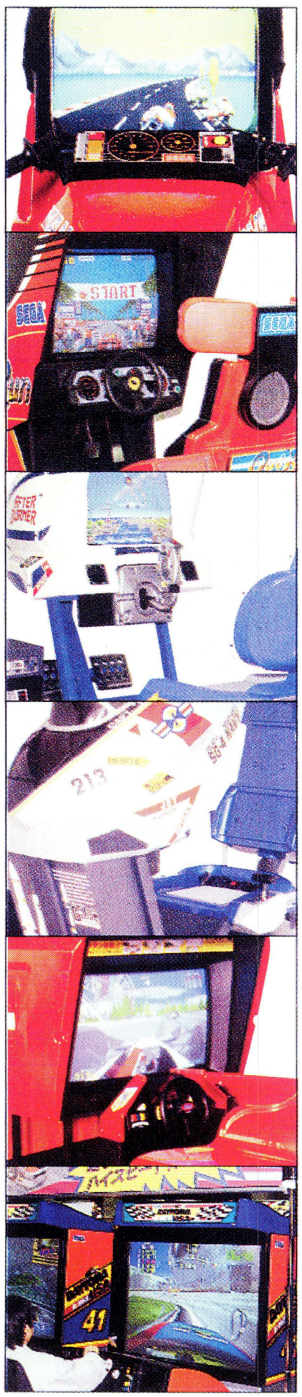
Scrolling: Two planes
32,768 colours
(128-colour palette)

Windows: Two windows
32,768 colours
(128-colour palette)

Sound: MIDI compatible

Yu Suzuki

Name: Yu Suzuki
Date of birth: October 6, 1958
Nationality: Japanese
Blood group: A
Position: General Manager, Amusement R&D Department 2, Sega Enterprises
Started: April 1, 1983



Game history

Hang On (July 1985) This was the first in a series of great motorbike racing games from Sega. Its follow-up, *Super Hang On*, proved even more popular.

Space Alien (December 1985) Or *Space Harrier*, as it was known in the UK. This was an impressive display of Sega's sprite-scaling technology.

Out Run (September 1986) One of the most playable racing games ever created. With unlimited (for the time) visual appeal, *Out Run* ran and ran.

After Burner (July 1987) Although nowhere near as playable as *Out Run*, *After Burner* nevertheless became a coin-spinner of immense proportions.

Power Drift (August 1988) Advanced sprite scaling and an axis of rotation were the hallmarks of Sega's next level of racing performance.

G-LOC (May 1990) A mixture of sprite scaling and 3D polygons. Although a superior game to *After Burner*, it was, ironically, not as successful.

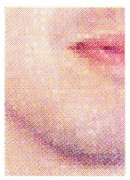
R-360 (November 1990) Take *G-Loc*, throw it inside a huge dedicated 360-degree rotating cabinet, and you get *R-360*. An amazing experience.

Virtua Racing (1992) The first game to use Sega's Model 1 board, *Virtua Racing* is one of the most exhilarating arcade racers ever designed. Fast and frenetic – a benchmark polygon shifter.

Virtua Fighters (December 1993) Using the same technology found in *Virtua Racing*, this one-on-one fighting game is technically outstanding.

Daytona GP (April 1994) Sega's latest and greatest racer. Unbelievable attention to detail and some of the most impressive texture-mapped polygons yet.

'I'm not keen on *Mortal Kombat* 2... I think it would have been a bigger hit if it hadn't been so violent'



Edge What about *Daytona*? Did a lot of research go into that as well?

YS Similarly, I've been racing regularly at the *Daytona* track in Florida and gathering useful information. I'm going there on Sunday, as a matter of fact. On business, of course!

Edge How many units can be connected together in the finished version of *Daytona*?

YS Originally, I had wanted to have 40 cars linked up, just like in a real race, but it just wasn't feasible. In the end eight cars can be linked up.

Edge And the Model 2 hardware? How did that evolve?

YS General Electric Co. approached us because they had realtime texture-mapping ASICs [application-specific integrated circuits] and we entered a commercial partnership with them in August 1992. We co-developed the Model 2 board with them over a period of a year, and *Daytona GP* took a further year to develop. [This division of General Electric has now been bought by Martin Marietta Corp.]

Edge What advantages does Model 2 offer over Model 1?

YS Well, there's obviously the texture mapping, and there are almost twice as many polygons – 300,000. But there are also special effects like the reflection of the sky in the windows of the cars – that's all handled in hardware by separate algorithms.

Edge What about graphic techniques like Gouraud shading?

YS *Daytona* only uses Gouraud shading in the attract sequence – the actual game uses flat shading, which is much faster and I think gives a good enough impression. I'm pretty sure *Ridge Racer* has been programmed in the same way – if the game used Gouraud shading throughout I think it would be between three and five times slower.

Edge So do you think Model 2

Continued next page

Sega feature

beats Namco's System 22?
YS Personally, yes. I think the driving sensation in both games is similar, but I think our graphics engine offers slightly more performance. *Ridge Racer* is a great game, but I think it would have been better if I'd handled the project myself!

Edge Do your staff enjoy playing games themselves?
YS Usually, yes, but speaking personally I prefer to find more interesting things to do than playing games – such as racing cars and eating French food.

Edge Do you like any non-Sega coin-ops?
YS Oh yes. *Ridge Racer* is my personal favourite, if only because of its computer graphics, but I also like some of the SNK fighting games – such as *Fatal Fury 2* and *Samurai Shodown*. Generally speaking, the quality of coin-ops tends to be much higher than consumer games. I'm not keen on *Mortal Kombat 2* – it's too violent and bloody for young children. I think it would have been a bigger hit if it hadn't been as violent.

Edge What are your personal Sega favourites?
YS I'm still quite fond of *Out Run*, which was a big hit in 1987 – this was the first game to use the Super Scaler technology. I think the impact this technology made at the time has now been repeated with *Virtua Racing* and *Daytona GP*.

Edge So you think technical innovations are just as important as gameplay?
YS I'm very keen on the technological impact a game has, but ultimately the success of a game rests on how much fun it is to play.

Edge What do you think the future holds for coin-op games?
YS Virtual reality and computer graphics currently represent about 30 per cent of the coin-op market, and that's a large proportion. When hardware costs eventually come down, 3D will start to make greater inroads into the market.

Edge What are Sega's plans for virtual reality?
YS The most difficult aspect of virtual reality is the cost of production, and making hardware that's durable enough for home and arcade use. In general, there are three main problems with current virtual reality technology: sensors, image generation, and projection technology. Of course, Sega have no problems with image generation, and we're doing research into the other two areas now, with the help of Virtuality in the UK.

Edge Where do you see the coin-op market going?
YS At the moment it's growing again – there are good opportunities for us in Asia and South America. As for the USA and Europe, the market isn't as saturated there as many people are suggesting. Coin-ops will continue to deliver high technology but I think the market is getting increasingly family orientated. Sega are reacting to this with small family 'Disneylands' offering games for all the family, and VRcades.

'I prefer to do more interesting things than play games – such as racing cars and eating French food'

Edge Tell us about Titan...
YS Titan is a new arcade board that's very similar to Saturn, only with a bigger memory and a good serial I/O. The sound is different – it's got a custom sound board – and the hardware's been speeded up for greater performance.

Edge So Titan is more powerful than Saturn? Is it also more powerful than Model 2?
YS Yes, the system's more powerful than Saturn, but the performance isn't comparable to Model 2. Model 2 is a pure 3D graphics engine with very high-technology hardware, and is naturally more expensive than Titan. Also, Titan is based on 2D-technology hardware.
[One of Saturn's first action games will have a 2D polygon-based environment.]

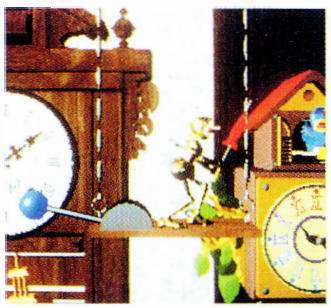
Edge How many more Model 1 and 2 games can we expect to see in the near future?
YS I'm not sure. We have a couple of Model 1 games in the pipeline, although it's possible they'll get ported up to the superior hardware. At the moment we're working on a 3D tank simulation with Martin Marrieta of General Electric.

Edge And what about other new hardware in the offing?
YS We have about five or six hardware projects in development at the moment, but the only one I can mention is Model 3. Compared to Model 2, this is a very high-performance board. Many people will be surprised at the performance!

Although the success of *Daytona GP* looks assured, it is evident that Yu Suzuki's team will not be resting on their laurels. With the successor to Model 2 apparently in the development, as well as other mysterious projects, AM2 is already moving on to bigger things.

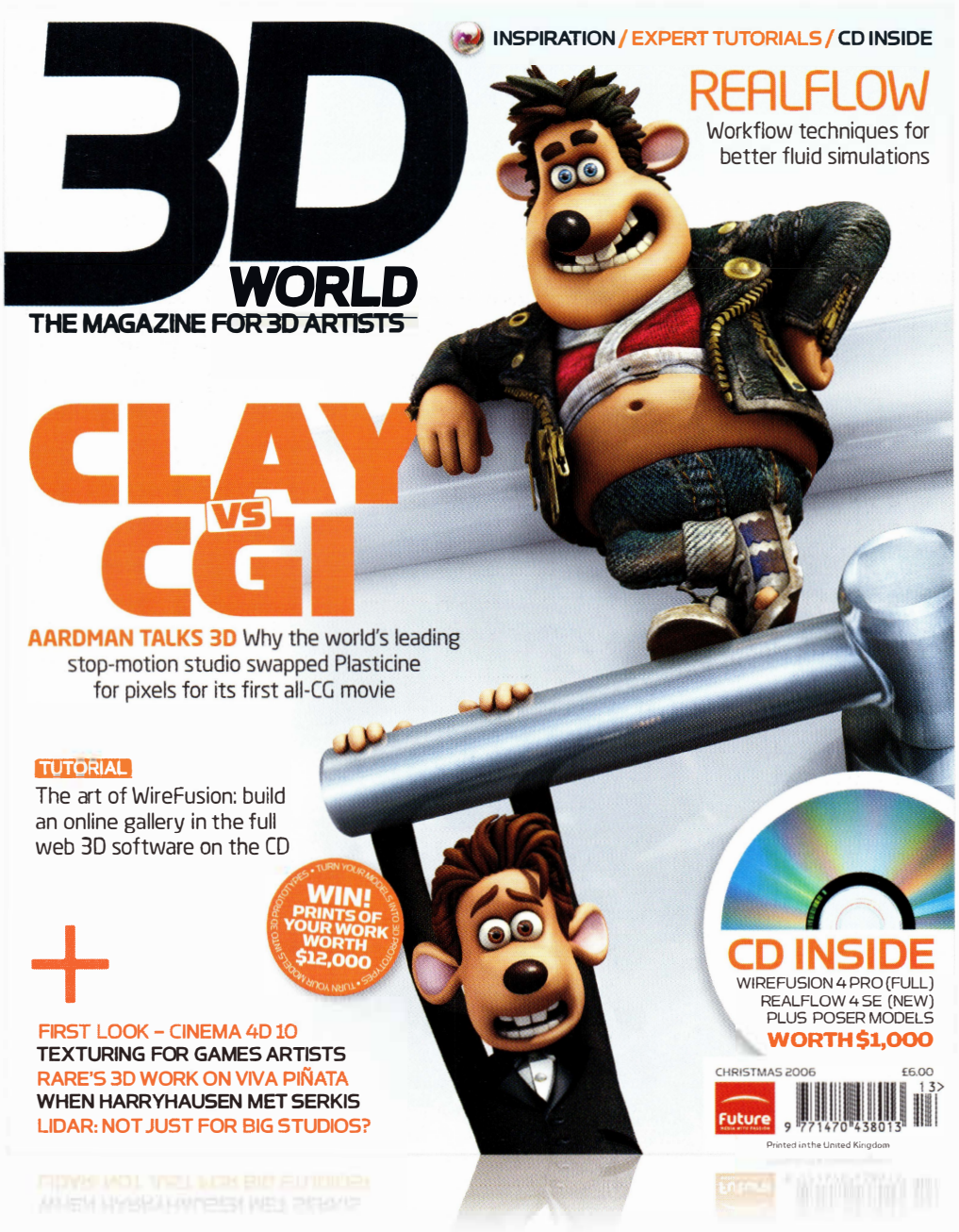
(Thanks to Hibi Misao for co-ordinating this interview.)

This is the powerhouse where Sega's coin-ops are conceived



One of the first Saturn games uses polygons for its 3D backgrounds

FROM PLASTICINE TO PIXELS



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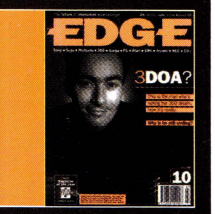


Nintendo Company Limited president Hiroshi Yamauchi suggests that with its surprise console it will "open up a new field for entertainment" by delivering virtual reality experiences without the need for head-mounted displays or even a TV screen. From Game Boy designer Gumpei Yokoi, it's sure to be interesting...

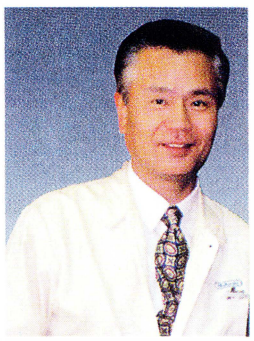
Cutting Edge

The very latest **news** from across the entire world of videogaming

Nintendo: 32bit machine for '95

The Japanese giant prepares a 'strategic product' to follow the Famicom and Super Famicom

Nintendo's headquarters in Kyoto, Japan. The Japanese giant remains bullish about Project Reality, but its new system 'will open up a new field for entertainment'



Nintendo's hardware supremo Gumpei Yokoi, inventor of the Game Boy

Nintendo like surprises, and a press release issued from their Kyoto headquarters in mid April packed one that few could have predicted. According to the release a 32bit dedicated virtual reality games machine will debut in the spring of next year. Not to be confused with Project Reality, this new system is already in its final stages of development and is set to make an appearance at the 'Shinsakku Soft no Tenjikai' or 'New Software Exhibition' taking place in the middle of November this year.

The most unusual feature of this new machine is that it will enable the player to experience the sensation of virtual reality without using a →

'Nintendo has a commitment to gameplay that we haven't seen from any other publisher'

Dave Jones, DMA Design

Dave Jones, DMA design: 'We've gone with Nintendo because it's a very good deal and a very good system'

←conventional television screen or head mounted display (HMD). Quite how Nintendo hope to do this is the centre of the whole mystery – Nintendo Japan are refusing to comment any further, with President Hiroshi Yamauchi offering simply, 'We're going to open up a new field for entertainment.'

The only real clue is that Nintendo are collaborating with an unnamed US company for the picture display hardware and virtual reality software. **Edge** has heard this unnamed company already has dealings with Project Reality partner, Silicon Graphics.

Priced at a fiercely competitive ¥20,000 (£125), the system is rumoured to be based around the NEC V810 or V820 chip.One popular rumour floating around is that the system has a built in laptop or Apple Newton-style screen. However, some form of projection technology is a possibility that's not being ruled out.

Whatever the case, '2D Virtual Reality' is a phrase the Japanese have been known to coin from time to time. And already, sceptics are claiming this is an stop-gap product rather than a product to carry Nintendo through the next generation.

Some insiders even claim it was set to be scrapped before a counter-attack was needed to fight Sega and Sony. A low cost VR system is unlikely to interfere directly with Sega or Sony's plans, but Nintendo's philosophy has always been to look towards new and exciting developments.

Of course, the horrible delays and costing problems that the big 'N' is allegedly experiencing with Project Reality might be another factor that's spurred this announcement.

Nintendo claim that new VR software for the system will cost less than current Super Famicom software. With the Japanese games market proving fiercer than ever, software pricing is likely to become an issue on which the new battles will be fought.

Just how good this machine will be and what exactly it will mean for gamesplayers isn't clear, but at least it confirms suspicions that Nintendo were 'up to something' all along.

Meanwhile

work continues on Nintendo's real assault on the videogame market – Project Reality. It's this system, and not their VR system, that will become the successor to both the NES and SNES and a potential rival to Saturn and PS-X. Following on from news last month about Rare's *Killer Instinct* game, Nintendo have just announced the cooperation of respected Scottish development team DMA Design – the guys behind *Lemmings* and *Walker*.

DMA founder, David Jones comments: 'I have had the advantage of viewing the early stages of virtually every next generation game machine being developed in the world, and there is no question that Project Reality is in a class by itself. Nintendo has a commitment to gameplay that we haven't seen from any other publisher.'

Whether DMA will be developing for the arcade version of Project Reality is unclear, but it's unlikely they'll need reminding that their only involvement in this area – a version of *Lemmings* from Data East – bombed without trace.

Nintendo's Project Reality, will first be shown on an invitation-only basis at this Summer's CES in Chicago with their arcade game hardware debuting behind the scenes at this year's JAMMA show in August.

After a long period of silence and apparent inactivity, the Nintendo games machine seems to be back on the rails again. Let's hope it stays that way for the foreseeable future. E

Project Reality development at NCL: the first three games will be versions of *Metroid* (top), *F-Zero* (middle) and *Zelda*

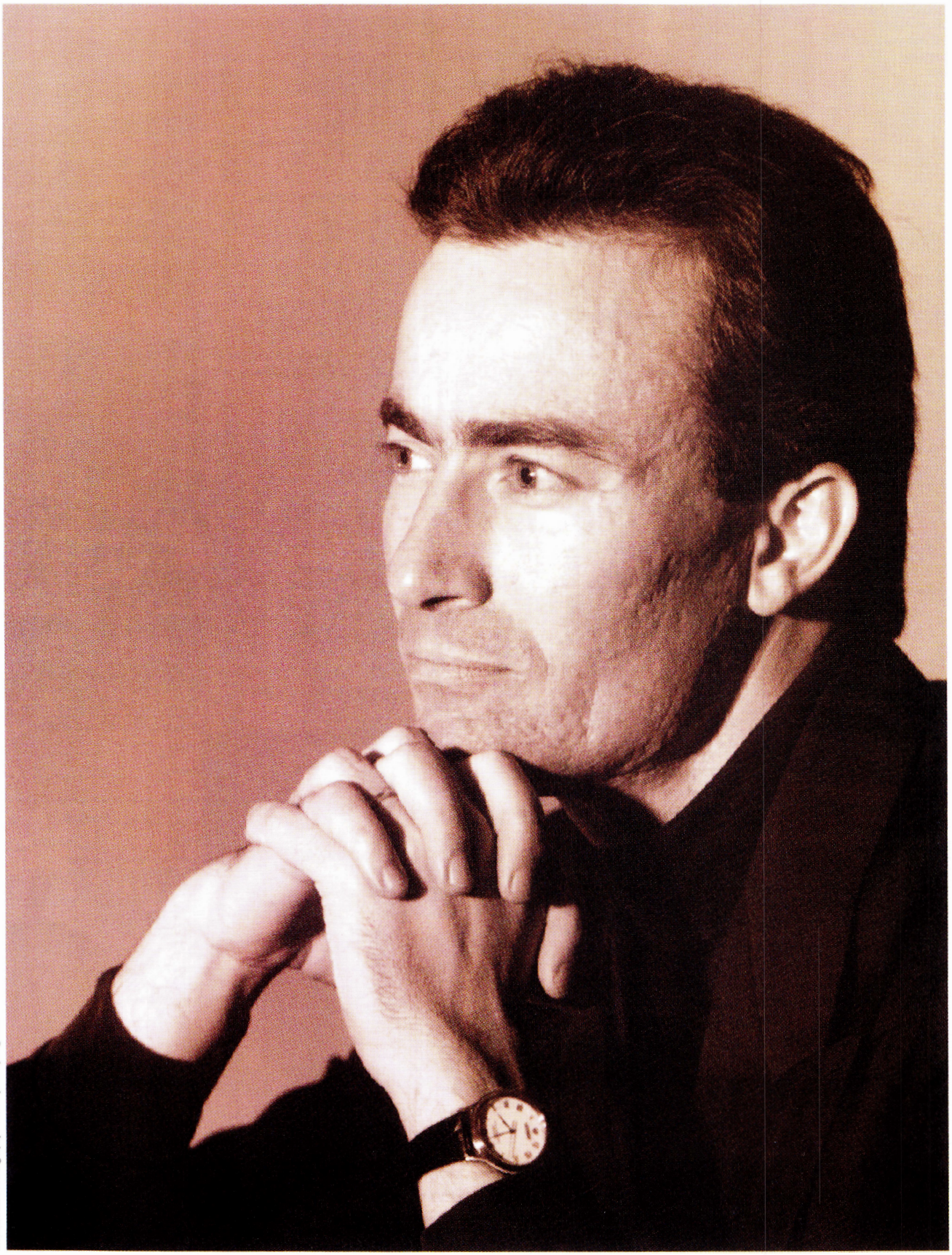
Nintendo's USA Chairman Howard Lincoln: 'The key is DMA Design (above) evaluated all the technologies and chose ours as the best'

What is it?

It takes place between 26th-30th October at Earls Court, London. It features all the latest developments in the world of multimedia and videogaming. Computer and console enthusiasts will kick themselves if they miss it...

Trip Hawkins

His 3DO console's launch has been delayed in the UK, but already Trip Hawkins is talking up its successor, which promises to "blow [Saturn and PS-X] out of the water". Here, he talks about adding disk drives and printers to his first console, and how his competitors are overrating the value of polygons...



Monochrome Photography: Christopher Springmann

EDGE magazine July 1994

Is Trip Hawkins still dreaming?

The promise of a global standard for interactive entertainment looks as far away as ever. So what is 3DO's CEO playing at?

Colour Photographs: **Peter Canning**

At 40, **Trip Hawkins** is one of America's hottest new entrepreneurs. After ten years of building Electronic Arts into the world's largest entertainment software company he went on to convince some of the world's largest investors that a new unproven format would be the future for interactive entertainment...

But already, dark clouds are hanging over 3DO's plans. How will a delayed UK launch and the impending threat of the Japanese giants spoil the 3DO campaign? To get some answers, **Edge** talked at length with Trip at the Spring ECTS.

Edge *Do you really think there'll be room for yourselves, as well as Sega, Sony and Nintendo, in the interactive entertainment market?*

Trip Well, the market's going to be very big. And there's never been a standard in the interactive industry. It's just that in the long run, the consumer would be better-off if the industry evolved into a more standardised approach.

Edge *And that standard should be 3DO?*

Trip We're throwing our hat in the ring and saying we'd like to become a standard – but you have to earn that. Maybe there's a market that's dominated by one technology, or maybe one that's split up by two, it may have three; it may have ten. The more different formats there are, the more it divides up the efforts of the software industry and the more it creates confusion for the consumer and problems for the retailer trying to stock everything. So in that sense, it's a not a good thing.

On the other hand, you don't want to have a standardised market based on a product that's not adequate. So you're gonna have competition until there's a clear

Continued next page

Trip Hawkins

winner that has the right technology and all the right business characteristics.

Edge *And 3DO is good enough?*

Trip We think we have the right starting point. It's not really fair for anyone to compare our 1993 products against their plans for 1995. We haven't made any announcements for our plans for 1995. But we're fairly comfortable that our next generation hardware will blow everything those guys are doing out of the water!

Not only that, since we started earlier and we know our hardware can be backward compatible. From day one our next generation system will run all our existing software – so that gives us a head start. None of our competitors have ever made two systems that run the same software.

Edge *So you're working on a replacement system rather than an upgradeable one?*

Trip There's different ways you can approach that. For somebody that buys the current player, there's quite a bit of expansion capability for it: they can add MPEG, they can add more memory, they can add a modem – in the future they can buy other peripherals like a disk drive or a printer; they can probably even add a DVD optical disk player in the future. So there's a considerable growth path there.

On the other hand, if you go in and change the fundamental processing characteristics of the machine, if you want to go to much, much higher performance levels you can't. So projects like the Mars add-on for the Mega Drive, won't be as powerful as the Sega Saturn. At some point you've got to reset the hardware.

Edge *Do you have a timescale for this new machine?*

Trip We don't have anything to announce at this point. We feel that right now we're the only company that's supplying a really advanced CD system – and that's going to be true for the next several months.

We want to make as big a market as we can with our current product. We don't think we need a next-generation product until there's much more pressure in the marketplace.

Edge *How scared do you think Sega and Nintendo are of 3DO?*

Trip Companies like that don't get scared.

Edge *They must be aware of what you're doing?*

Trip They're not scared, but that suits me. The way companies hang on to their marketshare is by being scared.

Edge *Are you worried by the advent of consoles like Saturn and the PS-X, which seem so much more powerful than 3DO?*

Trip Sega and Sony are anxious, and they're just trying to mess up our plans as best they can by promising the world everything.

Edge *But no-one can ignore a company as big as Sony. How do you see PS-X competing with 3DO?*

Trip Sony have had a graphic workstation business; they understand polygon rendering and have special customers that demand it. But I think when Sony come to market they might discover that they've underestimated how important traditional cell animation is and overated the importance of polygon rendering.

Edge *But surely polygons are important?*

Trip Polygons are fashionable at the moment – particularly in the arcades. But remember, we designed our system in 1991. None of the microprocessors Sony and Sega are using in their systems were available at the time we designed ours. They've simply picked a higher benchmark in performance.

Besides, games like *Total Eclipse* and *John Madden Football* combine great texture-mapping and polygon rendering, and that's a pretty satisfactory experience right now. I'm not saying that more performance wouldn't be better – all these technologies are going to get better – that's the difference between first generation and second generation. With our next generation hardware, polygon rendering will probably be an area we'll get more heavily into.

"I'm still fairly comfortable that our next generation hardware will blow everything else out of the water..."

Edge *But there's still a danger that people will hold off on 3DO now simply because they know the Sony machine's coming out?*

Trip There's a basic principle about consumer electronics: it gets more powerful all the time and it gets cheaper all the time. That's true of all types of consumer electronics.

If you always wanted to wait for something better, you'd never buy anything, right? We're all going to be dead in 100 years, so in the meantime if you want to use the most advanced system this year, then you have to buy a 3DO.

But, if you bought a machine last year, you're not going to buy another system this year – no matter how good it is. So the guy that we're really targeting our system at this year is one of the guys who bought a 16bit system three or four years ago and has pretty much had it with that, and he's ready to buy something new. Maybe in three years time he'll buy something else.

Edge *What happened to 3DO's plans to enter the arcades?*

Trip Well, there are three companies right now working on arcade machines based on 3DOs. American Laser Games are in fact very close to releasing their first 3DO product. Atari Games are also working on a couple. Electronic Arts are also exploring that area.

Edge *What's happening with the UK launch of 3DO?*

Trip Well, we're still in the planning stages, and we're going to release the product in early September. There had been some discussion about doing it sooner, but based on the success we've had already, and the launch of the product in Japan, everyone concluded we should take our time and make sure we have all the right elements in place to do a really successful launch. We don't think it would really accomplish anything to go out sooner than that.

Edge *You mentioned Japan. What about companies like Konami and Capcom? When are they going to start delivering some 'killer' software on the 3DO?*

Trip Well, some of those companies are having pretty good discussions with us right now. I shouldn't speculate a lot about what their plans are because every company feels differently about when to announce what they're doing with 3DO. But as far as videogames are concerned, I think we've got very strong support in general. There are a lot of software companies, and nobody's been able to get all the programmers to devote themselves to a new machine; you have to earn that kind of loyalty over time.

But we also think that we've got more quite a lot more support than any new

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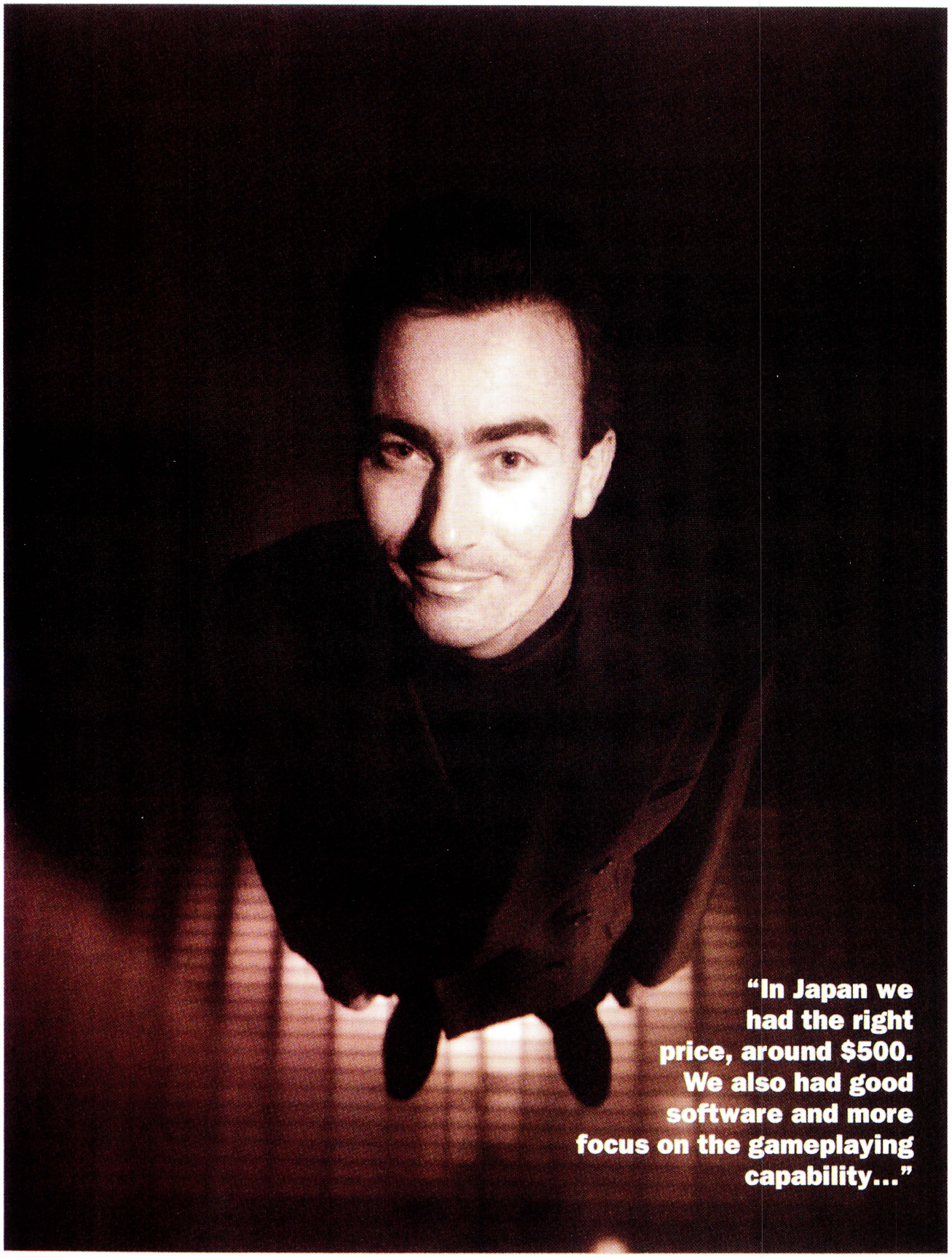
Trip Hawkins



format has ever had. Obviously the guys that have been the most loyal and the biggest supporters of Nintendo, moved pretty slowly to Sega, and they'll move slowly to a format like 3DO. The same is true of guys that are coming from a dominant experience on other formats like the PC.

Edge *Are you happy with the software support you've received so far?*

Trip The only problem we've had is the amount of time it's taking people to develop titles. We started supplying development systems about 18 months ago, so I think that's a pretty good indication of what the Sega and Sony launch schedules really are.

It takes about that long because your normal development cycle is going to be lengthened – you have to take time to learn how the machine works and what you can do with it. And initially, a lot of companies avoid trying to make a really radical new kind of title for a new system, because that would involve learning a new machine and learning how to make the new title at the same time.

So most developers say to themselves; 'Let's take an existing title and let's learn this new machine with it'. What that means initially is that you have a lot of products that are only slightly better than games in the same genre on another machine – and the titles that really take advantage of the machine come along later.

With the 3DO, it's been about 18 months, and now we're starting to see, instead of a trickle, a flood of really good products. Every week or two something new is coming out.

Edge *You said that the Japanese launch was a success. Why wasn't it as successful in the US?*

Trip In Japan we had the right price, which was around $500. We also had good software in the key categories and more focus on the gameplaying capability, so more of the marketing effort was targeted at game customers.

The distribution was also geared towards stores that could distribute both software and hardware, so there was much broader distribution initially and more effective promotional and merchandising execution. It was just better preparation by everybody who was involved with 3DO.

Edge *So can we expect the UK launch to be as successful as the Japanese one?*

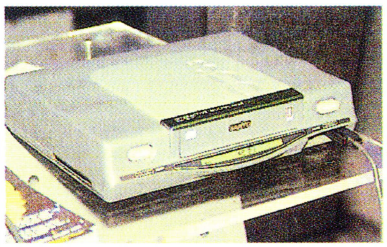
Trip We'll look at the Japanese launch as a model and aspire to have things go as well as they did over there. And that's part of what we're trying to do right now in the US – to just straighten out the problems we've had.

Edge *Are the games currently out on 3DO the be-all-and-end-all, or are they just a Trojan horse for other applications still to come?*

Trip I think games in the long run are still the most important application. I almost view all the other non-games stuff as the Trojan horse in that if you've got a 25-yearold married man trying to convince his wife why they should buy 3DO, he's going to use all the other capabilities as the Trojan horse.

People have a way of watching television, people have ways of watching videos and listening to their music. Even though digitally we can enhance that, in the long run what's profoundly unique is the fact that 3DO's an interactive system. I think also that over a time, you'll find educational interactive software becoming very significant, but it still won't be as big a business as entertainment software.

The Real Interactive Multiplayer: "We think we have the right starting point – but it's not really fair to compare our 1993 products against other people's plans for 1995..."



"We spend what needs to be spent to build a longterm business – and then to make profits in several years..."

Edge *How many 3DO units are there now in households worldwide?*

Trip It's approaching 100,000.

Edge *How many do you expect to sell by this time next year?*

Trip Certainly well over a million.

Edge *How many units will Panasonic have to sell to be in profit?*

Trip I don't really know about that one. The way we look at it is to spend what needs to be spent initially to build a longterm business, and then to make profits in several years. So I don't think Panasonic have a specific profit in mind. They've said that their fiscal year ends next March, and they want to sell more than a million machines in that 12-month period.

Edge *Which launch do you think will prove most successful for 3DO as a concept?*

Trip I can't tell you how important it was for us to be successful in Japan. Obviously, Sega's strongest market is the US, so it's important for us in competing with Sega to be strong in Europe and to be strong in Japan. Those are the markets that we can more easily carve out a meaningful competitive position. And with respect to Nintendo, historically they're the only guys who are going to sell anything in Japan. So the fact that we've been able to establish a good market gives us a good chance to have a much more diversified international business right away, and that's very attractive to software developers.

Edge *Which units can we expect to see in stores and when?*

Continued next page

Trip Hawkins

Trip For this fall in the US, you'll see at least two models from Matsushita, one low-end and one high-end one. And machines from Sanyo, Creative Technology and Gold Star, probably.

Edge *How important do you see MPEG?*

Trip From a competitive standpoint, since Philips has it, we can't choose not to have it. But I don't think it's that important, to be honest.

I could show you a couple of titles that illustrate this – you can get pretty good software video without it and it's reasonably expensive to have it. It's not going to replace your VCR; you don't get the quality or the playtime for it really to become the next movie format.

Edge *What do you think of CD as a format for your software?*

Trip I think it's a really good format because its very inexpensive. The music industry has driven the cost of CDs down to nothing.

Although there's a lot of complaints about the performance of CD systems generally, I think there's a changing aesthetic about gameplaying, and over the next couple of years people will start to appreciate and enjoy the kinds of things they can do with 3DO.

And game designers will get cleverer at integrating video, so it doesn't seem like a totally disembodied separate feature with nothing to do with the game it's used in.

Edge *Do you think that the 'killer-app' is a myth?*

Trip I think for this kind of machine it could be because there isn't any one thing that every customer universally wants to do. It's like a TV or a VCR, there's such a range of things it can do, and there's not one thing that will appeal equally to every customer.

Edge *Why did you drop the price?*

Trip We wanted to build our market more quickly. We have a certain amount of time before Sega and Sony are shipping products and we want to make the most of it.

Edge *How much potential do you think there is for the price of 3DO to drop in the next six months?*

Trip We've already accelerated the price drop to make it happen sooner by doing a business deal with Matsushita, so there's a possibility that the price could come down even further by Fall – but not by very much.

Edge *How do you see the PC and 3DO getting along together?*

Trip I think that in around five years from now, a standalone CD system will be so much more powerful than a PC for playing games.

It will be so inexpensive that the idea of playing games on a PC – well, nobody would care about doing that anymore...

I see the PC market as a transition step. Today, from the point of view of the customer, you can have a videogame system that has certain limitations, or you can have a PC. But in truth the PC is not really suited for playing games as such. It's just that it's cheaper to develop on a PC than on a cartridge-based machine.

Edge *The main criticism of the 3DO hardware so far has concerned the CD drive. Will you or Matsushita tackle that issue?*

Trip You've got to separate hardware from software. On the hardware side, our CD is twice as fast as Philips' CD-i and twice as fast as Mega CD. It's matched up with a lot more memory in our system and a lot higher processing power. When you look at specific software applications, I think developers are just now in the process of learning how to master load times to utilise the CD capability effectively.

Typical videogames today take up about two megabytes of data – and we have three megabytes of main memory in the 3DO. So if you don't want to use the CD, 3DO still has a lot more memory than its rivals, in case you just want to load the game up in the system's RAM.

The main point about games development is that you want to use all the capacity that you can in any system, but you don't want to do it in a way that will slow things down too much when the application is actually underway. Doing all that on 3DO is a thing that the software industry will gradually learn how to do better.

"With MPEG you just don't get the picture quality or the playtime for it to become the next movie format"

On a more general level, consumers have to see more and more examples of good software before they're going to be convinced that CD is a better solution than cartridges. They also need to see the prices come down, because there's no reason why in the long run that CD's will cost anywhere near what videogame cartridges do.

If you look at the manufacturing cost and licence fees of a cartridge, the total cost is over $20; and that's why retail prices are so high. With a CD system it's just a few dollars for manufacturing and licence. So you've got the opportunity to have much lower average prices – and you've also got longer shelf life because you can keep reducing the price to keep the product in the retail stores.

Edge *Do you still have the same enthusiasm for creating a standard now that all the other companies – Sega, Sony, Nintendo etc – have announced their products?*

Trip Well, there's a lot of hardware companies out there and we knew all along that some of them would continue doing their own thing. We're pleased so far, at least with the fact that Sony, Nintendo, Sega and Atari are doing their own thing.

Now if they all decided to work together and form a standard amongst themselves, then that would be something special. But the fact that each of them are just trying to make their own systems work independently makes it tougher on all of them. In our case we're building up a pretty good family of companies who over the next few years will give us a good chance of succeeding.

Edge *What's been 3DO's greatest achievement to date?*

Trip We got the hardware to work. A lot of people said last year we couldn't do that. People have criticised us all along.

A year ago they were saying they can't get their chipset to work, they'll never be able to finish their operating system, they'll never be able to manufacture the product, they'll never get it shipped this year. There was even one article that said you'd see pigs flying in formation above San Mateo before you'd see our product come out!

So I think getting it out was a pretty significant accomplishment. It's one thing for Sony and Sega to have a spec sheet and another to deliver a working product. We already have one.

Edge *What do you think is the next most significant step?*

Trip Well, I think getting the product out was number one, the next step is getting good applications out there, and that's already started to happen. The next thing after that is to sell more hardware – that's what it's all about in the end.

Edge *Thanks Trip.*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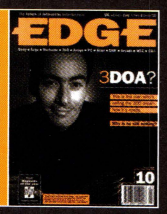

Veteran game coder Jeff Minter welcomes **Edge** to his Welsh abode, where he's putting the finishing touches to Jaguar *Tempest 2000* and mulling over future iterations of his light synth technology. Topics on the agenda: getting started on the Commodore PET, getting a game 'toasted' in the press, and getting drunk.

An audience with Jeff Minter

Edge shares a spliff with Jeff Minter – a man deeply in love with sheep, goats, llamas and Jaguars...

Few people who've had a computer over the last 10 years can have failed to notice **Jeff Minter**. His games are very original. As is his taste in beasts – which includes goats, sheep, camels and llamas. His appearance is shaggy – and he's the one man who, if told he is acting the goat, will take it as a compliment.

Jeff has carved a little niche for himself in games history, being the inventor of the camel shoot 'em up, the light synthesiser and numerous exotic game sub-systems, which have alternately delighted and baffled the public for the last 12 years.

After a period of success with his label Llamasoft, Jeff vanished for a while, and passed his time skiing in France and writing games for the doomed Konix game system. At Llamasoft's lowest ebb he wrote a groundbreaking shareware game called

Llamatron, based on Eugene Evans' classic Williams game, *Robotron*, which swept the board and became the most popular shareware game ever.

This dug Llamasoft out of a big hole, and enabled Jeff to take stock and firm up his already tight relationship with Atari – for whom he now develops games and sub-systems for the Atari Jaguar. In fact he's currently working on a light synthesiser for the Jag's CD-ROM unit, with his spin-off business, Virtual Light Company, whose usual task is to go to rave gigs and concerts to set up their industrial strength light synths.

Jeff lives in a remote valley in Wales, and divides his time between there and Sunnyvale, California (where Atari are based). He also has a little place in France from where he skis.

His conversation is peppered with sheep references, like his house, which has toys, posters, pictures and models of sheep, goats, llamas and camels – plus mementos from his trips to Peru.

Jeff has a 486 PC Tower, an Atari TT with Jaguar development system, and various other computers and systems. There's also about four or five arcade machines dotted about, with his two sheep, called Molly ('has her charms but she's not Flossie') and Flossie ('the prettiest sheep in the world') rambling around them.

Edge So, how did you get into coding originally?

Jeff Originally? When I was at sixth form college in about 1979 they had a Commodore PET. I just wandered into the room and there was some guy playing this very simple driving game. I asked the guy, 'Where did you get that game?' and he said 'I typed it in.'

So I went off to the library, borrowed a big book on BASIC, came in early the next day – and that was it, they got me. I loved it, fell hook line and sinker for it. I stuck with BASIC for about three months, and soon ran out of horsepower, so I learned 6502. On an 8K Commodore PET? But a bloody good grounding – if you can code on that you can code on anything!

Edge What was your first Llamasoft game?

Jeff *Andes Attack* on the Vic 20. We were amazed because we duplicated copies of this game and we went to a computer show. We sold them for a tenner a shot – and we sold out on the first day!

At that time all the UK coders were getting away with murder, they were writing really crap stuff that was all written in BASIC – and I'd been writing in code for a few years, and people were just amazed! That game did quite well in the States, and then I wrote *Gridrunner* which also did quite well in the States and earned me a nice little pile of money.

Edge You've got something of a reputation for new control systems. Did being totally original ever backfire on you?

Jeff I always tried to do new stuff, and in fact sometimes I got a bit slagged off for being too new. I remember doing *Mama Llama* and Julian Rignall gave me a right slagging for it because he didn't like the control method. You didn't have any bullets – you had that inertial droid. it took a while getting used to it, but it was quite a good game when you were used to it.

He totally trashed it in ZZAP 64 – toasted it, in fact. That really spoiled my chances with the distributors, because they were taking quite a lot of notice of that magazine at the time. So it didn't really get out there as much as the other games. I was *molto* pissed off about that.

Game design is so over-simplified now. You look at a game like *Defender* or *Star Gate*, you've not only got a joystick controller you've got normal control of thrust and stuff like that, and with acceleration you have to learn to fly the ship. Whereas you look at a modern arcade shoot 'em up, you push the joystick up/down, left/right, and you're scrolling through a rigidly defined playfield where everything appears at the same time – everything's on rails. It's just a regression.

Edge Do you see this changing or will it get worse?

Jeff I like the idea that with these new systems – this 64bit stuff – where you can build 3D worlds, people aren't going to put up with stuff running on rails. I think it happened because Sega and Nintendo stuff is aimed at younger people, who don't want complexity in their games. But I think it makes a game a lot more interesting.

I remember *Virus* getting slagged off and that was just the best game ever. And yeah, sure it took about two or three days to learn how to fly the ship, and it took a couple of weeks before you could handle yourself in a dogfight, but when you could the feeling was just ace. To move into a cloud of mutants spiralling around you and just kick butt. That would make a lovely game on the Jaguar actually, Gouraud shading and texture maps...

Edge You mentioned David Braben's *Virus*, so who's coding do you admire?

Jeff Loads of guys. Braben of course, Tony Crowther, Andy Braybrook. Obviously Jez San is really good, he does some really wicked 3D stuff. There's some people in

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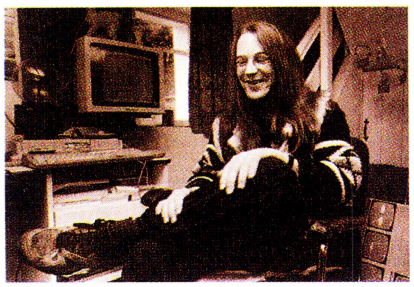
'I always tried to do new stuff, and in fact, sometimes I got a bit slagged off for being too new...'

Photographs: **Jude Edginton**

'Game design is over-simplified now... Look at a modern arcade shoot 'em up, you just scroll through a rigidly defined playfield... everything's on rails. It's just a regression.'

interview



'On the next project after the light synth I'll be doing a CD-ROM product and coming up with more psychedelic stuff.'

the States too, there's a guy called Rob Zdibble who worked for Atari for a long time. He's actually working on the 64bit version of *Star Raiders*! I cannot wait!

Edge All the old solitary coders are now in programming teams it seems. Will you always work alone or will you create a team one day?

Jeff That was an option when Llamasoft was doing really well – we could easily have turned into a software empire. We had the reputation, we had the money, we could easily have started getting people in to do coding. But I never wanted to do that – I wanted Llamasoft to be for my output. Now obviously I have to work with graphic artists and musicians.

That works if you've got a good rapport with the team, if you can actually put across your ideas, the stuff that you want. With Atari, they like the fact that they can give me something to do, and I run off with it and do it on my own... and probably do something different to what they thought of!

That happened with *Tempest*, for example. It is still possible for an individual to work in this industry, even if we do have to work with teams. On the next project after the light synth I'll be doing a CD-ROM product and coming up with the more psychedelic stuff. I like the idea of getting a reputation as a psychedelic programmer.

Edge You could have 'psychedelicist' on your business card...

Jeff Or perhaps 'Psychediliac'. Or should that be 'Psychedeli-yak'!

Edge So you do get 'project management' from Atari, but do you get the feeling they trust your instincts?

Jeff Yes. The guy who is my director, John Skruch, is a really excellent dude. He handles me really well, given he's got to take care of someone like me in a commercial environment. He knows how to ask me to do things without laying the pressure on too much. And he knows if they really need something I'll stay up late and pull the stops out.

He's doing his job very well in that he's keeping me sweet, but I bet there's times he wishes he could handle me like a normal programmer. 'Do this and do it now.' But, you know, respect to him because he doesn't.

Edge Are you led by hardware?

Jeff I was certainly well turned on by the Jaguar, and as soon as I saw it it was immediate lust. I wanted to take it into my life. I like that rush you get from a new bit of technology coming out.

The other reason I love the Jaguar is it's so easy to program. If you've programmed an ST or an Amiga you can go onto the Jaguar straight away. It's all laid out logically, you don't have to write in any arcane DSP language that looks like Martian – all Ls and Ks and Qs. It actually looks a lot like 68000 and it makes sense. It just happens to go damn fast as well!

Edge How about the light synth? Did you invent it or did you get the idea from somewhere else?

Jeff My earliest inspiration was being 11 years old, laying in a dark room, and listening to Pink Floyd's *Dark Side Of The Moon*. I just used to lie there and let my weird kiddy's imagination run off.

The second stage of the evolution was a party I was invited to when I was 14. Somewhere on the slope to drunken oblivion, I noticed these disco lights... you know those little traffic light things that sort of pulse vaguely in time to the music. I remember thinking to myself that there must be a better way of doing it than that.

And you know when you daydream in a boring class about being in a rock group – well I'd have those daydreams, but they'd always involve big screens, lights and lighting effects. I never had any idea of producing it, I just assumed one day somebody would make a machine like this and I'd be able to buy one, and I'd play it in the same way people play a guitar.

It was years later when I was programming the C64 that it all happened – I was out running and this algorithm just popped into my head. It was the basic flow/delay line algorithm that you see there on the Jaguar, the basic *Trip-A-Tron* effect, and I came back and coded it up. It was the only point that I thought I might have discovered something new, as opposed to re-engineering somebody else's stuff.

People are trying to do the same kind of stuff, but from what I've seen they're still so amazingly primitive, they still think colour cycling is a pretty neat idea. I can't however claim it's a completely original idea, because there have been people down the years who've tried colour organs, and things – for almost 100 years I think.

After I'd started coding the first light synth, I found a book by John Whitney, the guy who invented the slit scan effect at the end of 2001: A Space Odyssey. Well he wrote a manual for writing a light synthesiser. It was done when you couldn't do a lot of stuff in real-time – he had Pascal programs which would plot out these things in non-real time. He was saying there how different harmonies, different phases could correspond with notes on a musical scale, and how the results would be very pleasing.

So I don't think I can claim it all as original, but I had it in my mind before I saw anyone else doing any work like that. But it's been six, seven years since I released any new light synth stuff. To be able to put a version out in the home domain... it's going to surprise people.

Play an audio CD on the Jaguar and the screen's going to do that! I can crash my cleaning lady with this stuff. She comes in here and if I've got something good on there she'll just stop and stand there, slack jaw, standing still for about five minutes.

Edge So you've found a bug in your cleaning lady?

Jeff Well, not so much a bug as a slight susceptibility.

Edge Ahh... Well, thanks Jeff.

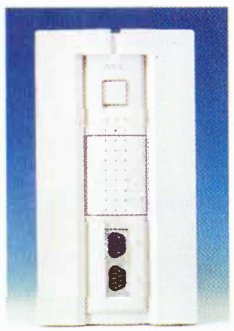
'My earliest inspiration was being 11 years old, laying in a dark room, and listening to Pink Floyd's Dark Side of The Moon...'

FX: NEC's new challenger

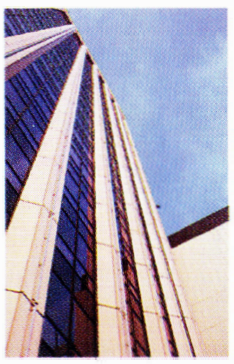
NEC's 32bit successor to the PC Engine is a very strange beast. Edge was treated to a hands-on test in Japan

The Japanese are setting the pace in the next-generation-machine race, and now NEC have added another runner to the field. Originally dubbed the Tetsujin (Iron Man) project, the FX system is the computer giant's bid to carve a slice of a fast-growing and competitive market.

Shaped like a small PC tower, the FX is a 32bit CD-ROM machine with the potential to play cutting-edge games. In fact, since last month, when **Edge** spoke to NEC Avenue about the PC Engine Arcade card version of *Strider*, the manager of NEC Avenue (one of NEC's principal software arms), Mr **Usui**, has told **Edge**: 'At the moment we're developing an ambitious shoot 'em up for the FX. This next-generation game uses 3D technology and all of the animation performance of the FX. We're really very excited about the potential of NEC's new machine.'

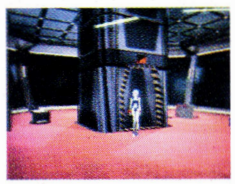


The FX's design is strange for a games machine – the functional styling makes it look more like a PC tower than a sexy new console



Edge visited NEC's Tamauchi offices, where the FX was revealed for the first time

In late May, shortly before the Tokyo Toy Show, **Edge** visited NEC's Personal Electronic Products Division in Tamauchi, Tokyo, and interviewed **Tetsuya Iguchi** from the company's planning department to glean some information about what this new system is actually capable of.



***FX Fighter* (top) uses shaded polygons. An adventure game is also planned (above)**

Edge How many people are now working on the FX project?
Tetsuya Iguchi Around 50 or 60 people are involved – not only engineers but also planning staff
Edge When did development on the FX project start?
TI About four years ago.
Edge When will the FX be released?
TI We'll release it at the end of November in Japan. We don't know when it will be released in America yet. In America, expensive games machines are difficult to sell, so we haven't come to a decision. It will also depend on the exchange rate between the dollar and the yen.
Edge How much will the FX sell for?
TI Less than ¥50,000 (about £300) for the hardware and one pad.
Edge How much will the software cost?
TI We still don't know how much third parties will sell software for. But we hope that it will be roughly the same price as it is now – between ¥5,000 and ¥10,000.
Edge Were NEC the only company involved in developing the FX? Did Hudson have any role in it?
TI We co-operated with Hudson for the manufacture of some components, but the machine will be marketed as an NEC product.
Edge Are Tetsujin and FX completely different projects?
TI No, they are similar, but Tetsujin was the name of the previous project, which has now been superseded by the FX. The FX has a different CPU, and some other details have also changed.
Edge Which thirdparty developers have signed up for the FX project?
TI NEC HE and NEC Avenue, of course,

Continued next page

Tetsuya Iguchi, of NEC's Personal Electronic Products (Planning) Division

NEC's Tetsujin project gets a final name and a slinky look, although it's difficult to see it attracting the software support offered to its PC Engine predecessor, let alone the new consoles from Sega and Sony. Still, if nothing else, it has the ability to receive faxes – ideal for the gamer working out of a home office.

news

***FX Fighter* (working title) has astonishing shaded polygons and smooth animation**

plus Hudson and Hunex. The thirdparty developers are all Japanese; there are no foreign companies involved.

Edge How many titles are now in development?

TI There are now 15 games in progress. But we can't say which company is developing these projects – it's not yet official. Most of the new releases will be games, including adventure games and fighting games. *Battle Heat* is planned, as well as a 3D adventure set on a ship. Four or five titles will be available at launch.

Edge What is the FX's main processor?

TI It's a V810 made by NEC, cadenced at 21.5MHz. The CPU doesn't have a formidable capacity, but all the other components of the board (graphics processors, etc,) make the machine is very powerful.

Edge What other processors does the system rely on?

TI There's only one graphics processor, and no animation processor, but there is a sprite processor, and there are also three video display processors.

Edge What's so special about the FX?

TI It's a DMA (direct memory access) machine. Data coming from the CD does not use the CPU bus, which is 32bit. Instead, it goes to the video-out port via a sequencer, an image processor – including a rendering chip – and a video encoding processor. This allows very high-speed animation. This is the big advantage of the FX.

Edge Is the machine MPEG or JPEG?

TI JPEG. In our opinion, JPEG offers a better quality of image for animation.

Edge How many sprites can be displayed simultaneously?

TI A maximum of 128.

Edge Does the FX have a polygon chip?

TI No, unlike other machines, the FX hasn't got a dedicated polygon chip. In machines which have a polygoniser, reduction and enlargement calculations are made automatically, but there is a limit to the calculations. In the FX, because there is no polygoniser, there are no limits to the calculations. The only drawback is the need for data for enlargement and reduction, but it is not a problem for the FX.

Edge Will the FX be compatible with the PC-98 series? [PC-98 is NEC's own PC standard, now the basis for a popular range of computers in Japan.]

TI In fact, it's a kind of cross between the two machines. The FX can actually be used as a CD drive for the PC-98.

Edge When will development tools be available?

TI The first tools were available at the end of last year. The most important tools were only available this month.

Edge What will happen to the PC Engine when the FX arrives?

TI In June a new PC Engine will be released – the Duo RX. We will continue to sell the PC Engine, at a new price of ¥29,800 [£180]. It will not be possible to use PC Engine software on the FX, →

Continued

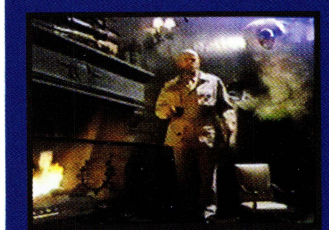
***Battle Heat* – a twoplayer anime-style combat game with varied camera angles**

'We're developing an ambitious shoot 'em up for the FX... we're really very excited about the potential of NEC's new machine'

Mr Usui, manager, Multimedia Division, NEC Avenue

Advertainment

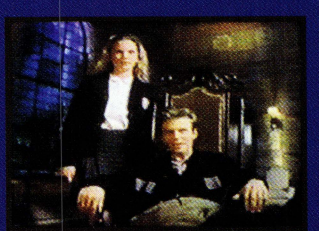
Edge's regular tribute to the art of videogame advertising puts 3DO's US TV campaign in the spotlight. Join us after this message...



1 The scene opens with the portly, tyrannical father stomping his cane aggressively against the ground and bellowing: 'What time will my daughter be home?'

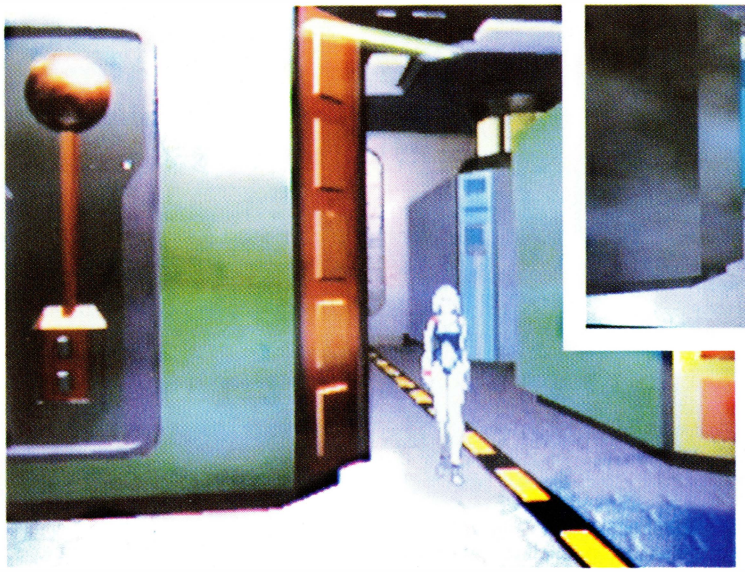
2 Cut to daughter with her young man. The man simply twists his hands in reply to the question. Voice-over: 'The passive type. Probably plays Nintendo.' Mario is shown in the background

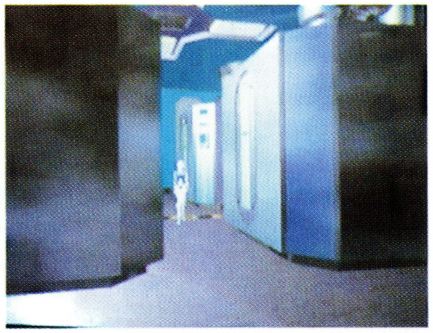
3 The same scene, but now a different suitor is being grilled. 'Somewhere between ten and two' is the casual reply this time. Voice-over: 'The aggressive type. Probably plays Sega'



4 Cut to yet another young man in the hot seat. He is asked the same question. His response: 'What, you mean you want her back?' The daughter smiles; the father is dumbstruck

Anime-style characters will play a big part in the FX's diet. This adventure features Sailor Moon-style figures





NEC have a number of games in progress for the FX. This one's an adventure set on a spaceship (no title yet), with varied viewpoints and a cast of three nubile anime girls

Who is it?

This man started programming in the late '70s. He went on to produce two of the most inspired blasters ever to grace an arcade: *Defender* and *Robotron*. His games have won the hearts of coin-op fans the world over

The FX can be used to receive and store faxes (including photos), but can't send them

← but we think the sales of both machine will be strong.

Edge How many FXs do NEC expect to sell when it is launched?

TI We plan to sell about 50,000 machines a year.

Edge Which company do you see as your biggest competitor?

TI We think Nintendo, with Project Reality, are our most dangerous rivals, because we do not yet know what kind of machine Project Reality is. However, NEC are not dependent on games; we deal with the whole multimedia market. NEC produce televisions, personal computers, telecommunications systems... We want to create a link between all these different products; we want to make products that can be used at home by all the family. For example, the FX can be used at home to receive faxes.

Edge Who is the FX aimed at?

TI High-school students or older.

Edge What distribution channels will you use for the machine?

TI We are going to sell it in toy shops. It is still a games machine and will be sold as a games machine, although it is for use as a component of a multimedia environment. The concept of multimedia is sometimes difficult for consumers to understand.

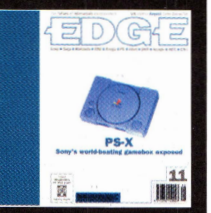
Edge would like to thank NEC for their hospitality.

NEC FX tech specs

CPU:	32bit RISC processor V810 (NEC), cadenced at 21.5MHz
Memory:	Main 2Mb; VRAM 1.25Mb; ROM 1Mb; CD buffer 256Kb
Back-up memory:	32K SRAM
Bus:	Full colour/fullscreen; 30fps; full scrolling
Graphics:	16,770,000 colours; 320x240 maximum resolution; maximum sprites 128; Maximum background screens 7, Rotation/enlargement/reduction/transparent/fade/priority
Video colour:	Transparent
Encoder:	Fade, priority
Image processor:	JPEG; horizontal scrolling; background one screen
Processor:	Maximum background screens 6, Rotation/enlargement/reduction
Format:	FX CD/Music CD/CD-G/CD-EG/ Photo CD (forecasted)
Pad:	Six buttons

5 The same stentorian voice-over intones: 'The other type. Definitely plays 3DO.' A stream of 3DO game clips follows, accompanied by rock music

6 The domineering father has met his match. Both the girl and the young man are now smiling. Fade to the 3DO logo. Underneath it is the line: 'What are *you* playing with?'



Finally, the full PlayStation story, detailing the thinking behind Sony's plans to enter the gaming space and the commitment to date from third parties. Far more exciting than the hardware's ability to "do *Galaxian*³ without breaking into a sweat", though, is the ability to link two units for multiplayer. Surely it's the future.

In 1988, Sony signed a deal with Nintendo to make a CD-ROM player for the videogames giant. The result would have been a Super Famicom-compatible console called the PlayStation

It was intended to secure Sony a foothold in the videogames industry. Yet it never happened. So Sony went it alone. Now the PlayStation has been reborn

With a Japanese launch less than six months away, and a hardware spec turning the heads of the world's best software developers, Edge wonders if this could be the start of something *really* big

Sony PlayStation

CPU
R3000A 32bit RISC chip @ 33MHz
Clearing capacity: 30 MIPS
Bus bandwidth: 132 Mb/sec

3D Geometry Engine
(High-speed matrix calculator)
Clearing capacity: 66 MIPS
1.5 million flat-shaded polygons/sec
500,000 texture-mapped and light-sourced polygons/sec

Data Engine
Clearing capacity: 80 MIPS
CPU, direct bus connection
Compatible with JPEG, MPEG1, H.261 files

Sound
ADPCM, 24 channels
Sampling frequency: 44.1Hz

Graphics
16.7 million colours
Resolution: 256x224–640x480
Sprite/BG drawing
Adjustable frame buffer
No line restriction
Unlimited CLUTs
4,000 8x8 pixel sprites with individual scaling and rotation
Simultaneous backgrounds
360,000 polygons/sec

Memory
Main RAM: 16 Mbits
VRAM: 8 Mbits
Sound RAM: 4 Mbits
CD-ROM buffer: 256K
Operating System ROM: 4 Mbits
RAM cards for data save

If it's not realtime it's not a game. Thus spoke **Akira Sato**, director of Sony Computer Entertainment. (SCE). This statement is an important clue to the logic behind the $500 million that Sony are reputed to have sunk into the development of the PlayStation – scheduled to go on sale at the end of this year in Japan and next year in the US and Europe. 'What PS-X provides is realtime movement on a games machine,' claim Sony. 'This gives the customer a new type of game quite different to anything that has existed so far.'

Since Sony started showing off its hardware to developers, excitement in the development community has been mounting. In Japan alone, 164 thirdparties have

Continued next page

Sony PlayStation

SCE's Akasaka Oji building in Minato-Ku, Tokyo (above). SCE vice-president Teruhisa Tokunaka (left) recently unveiled the PlayStation

signed development contracts (56 of these are still to announce their identity). In Europe and the US, the enthusiasm to develop for this breakthrough format has been described as 'unprecedented'.

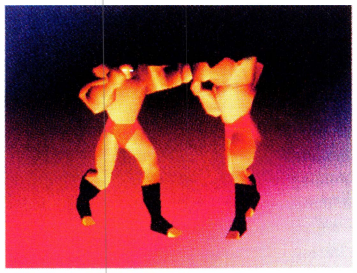
Although developers are still circumscribed by complex non-disclosure agreements which prohibit them from furnishing specific details about the machine, a couple of unnamed developers have assured **Edge** that Sony's machine is in a class of its own: 'It could do *Galaxian*^{3} without breaking into a sweat, and without disc access,' said one. 'It's going to revolutionise the way computers are at the moment,' offered another. Even though Sony have virtually no track record when it comes to the games hardware business, they have already convinced a confused and creatively hamstrung industry that their platform offers new directions for gameplay. And that's a seriously big pull for an industry that's been regurgitating ideas for almost a decade.

Sony's research

facilities in Japan have long explored different technologies in the fields of computer graphics, image processing and animation. The development of the PlayStation grew from a number of disparate discoveries in a Sony laboratory dealing with broadcast videotape recording and digital picture processing techniques. 'Rather than producing abstract concepts about the kind of games machine which might exist in the future,' explained a source at Sony Computer Entertainment, 'we decided to see what kind of machine could embody these discoveries. The PS-X began when we brought together various research directions and ideas about computers with enhanced performance.'

Sony Computer Entertainment was incorporated in Japan in mid-November with joint capital from Sony Corporation and Sony Music Entertainment. It employs around 250 people working on the PlayStation project, around half of which are hardware and software engineers, with the rest from other, more established, arms of Sony Music Entertainment Japan and Sony Corp.

Only in the last few weeks have SCE's marketing and public relations departments been kicked into gear. On May 20 a press conference was held in Japan during which vice-president Teruhisa Tokunaka demonstrated a mock-up of the machine and talked about Sony's plans for the system. To coincide with this, Sony placed a two-page teaser ad in a wide selection of Japanese gaming and consumer magazines, revealing the PlayStation's design and using an unconvincing joypad-wielding Santa to hint at a Yuletide release. More recently, visitors to the Tokyo Toy Show in June got their first look at the machine.



This fighting demo features polygon characters which are Gouraud-shaded and animated in realtime

As first revealed in **Edge** 6, the PS-X isn't being targeted at the multimedia sector; it's a games machine, with performance worthy of a workstation. There are longterm plans to allow the system to be networked (with the aid of a serial port connection), but it's clear that Sony have decided that the games market is their prime concern at the moment: 'We considered what would be the biggest market for this year or next year – what kind of entertainment our customers would want – and decided it would be games. The Japanese home games market – in terms of machines and software – is worth ¥500 billion [£3.1 billion]. The American market is twice that size and the European market is one and a half times that size. So the concept was to provide hardware and software aimed at this market. What we didn't want to do was simply jump in and take a part of the existing market.'

In hardware terms, the PlayStation is a formidable beast: Sony claim that it has a combined processing capacity of around 500 million instructions per second (MIPS) – as a raw comparison, 16bit consoles like the SNES and Mega Drive can handle around 1 MIPS. At the heart of the system lies a 32bit RISC CPU (an R3000A running at 33MHz). There are also four other processors: a 66 MIPS high-speed matrix operating processor (for calculating ultrafast 3D polygons); a

'We considered what would be the biggest market – what kind of entertainment our customers want – and decided it would be games'

The PlayStation hardware was given a public unveiling at the Tokyo Toy Show. Sony chose not to make a big noise about the system and no demos were on display

Continued

'There is no real difference between the Famicom and the SFC... the hardware being sold today is getting on for ten years old'

graphics processor for displaying sprites and polygons at 60 frames a second; a sound processor for reproducing CD-quality sound; and an 80 MIPS data expansion engine for decompressing graphics and sound data from the CD-ROM at high speed. Having been brave enough to commit themselves to CD-ROM, Sony have designed a system that will effectively ease the traditional problem of slow data transfer.

Sony believe that the videogames market has stagnated and that gameplayers are waiting for a machine like the PlayStation. 'In our opinion,' said one Sony official, 'there is no real difference between the Famicom and Super Famicom. When the Famicom came out it had a huge impact because all at once people could play computer games at home. You could stay at home and play the games you used to in arcades. But the same kind of impact wasn't felt when the Super Famicom came out. All the SFC has offered is an extension to the Famicom's performance – the gameplay is usually no different to the stuff they'd already had for years on the Famicom. Not to put too fine a point on it, the hardware being sold today is getting on for ten years old.'

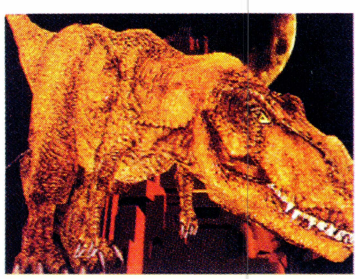
Sony's comparison with the Super Famicom is apt. In many ways the PlayStation reflects the design sensibilities of the 16bit Nintendo: the matt grey finish, the red, green, yellow and blue logo, and the superbly ergonomic joypads.

It's clear that Sony have tried to ensure that the PlayStation provides the gamer with everything they could possibly want from a system. The joypad is a case in point. Following Nintendo's success with the extra L and R buttons at the top of their SNES pad, Sony have gone one step further and slapped another two buttons on the top. This makes it possible for the player to access angles of view that would be awkward, if not impossible, to achieve on a conventional joypad.

Another worthy innovation is the inclusion of battery backed-up memory cards that plug into the front of the PlayStation, allowing game data to be saved. In-built SRAM, as used in the PC Engine Duo and Mega CD, soon gets filled, so Sony plumped for IC-card technology and plan to make a range of cards available with different memory sizes – a typical card will have a data capacity of around 1 megabit.

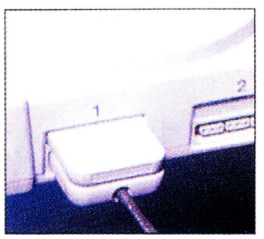
The PlayStation's most exciting feature by far, though, is its multiplayer link-up potential. The machine will be packaged with a lead to enable it to be connected to another machine, and an adaptor is on the way which will allow up to eight machines to be linked together at once. This provides opportunities for creating phenomenal software. With Namco's *Cyber Sled* already on its way, it may not be long before players can experience link-up games just like they're played in the arcades. Sony also have distant plans for a modem or even a hard-disk drive.

Sony's sales projections for the PlayStation in Japan are ambitious, to say the least: between



The dino-head demo seen in Edge 6 has now gained a body. Constructed from thousands of polygons, this beast can be manipulated in realtime

From top: the final unit could have a slightly different finish; the front of the machine shows the joypad ports, with the memory card slots located above them; the rear of the machine will contain a serial port for multi-link-up as well as S-video, video and audio connection; the joypad (side view – inset) has been expertly designed with four top buttons to access varied angles of perspective



One impressive feature of the PlayStation is the ability to plug in RAM cards (right) to save data. Players have their own cards for saving personal scores and game data. The cards fit into a slot above each joypad port (left)

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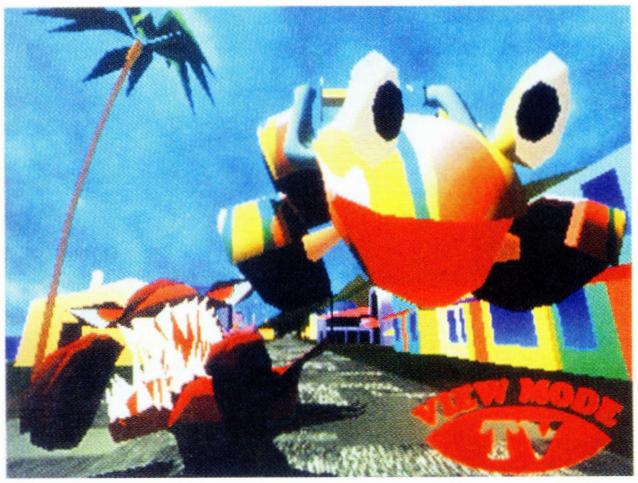
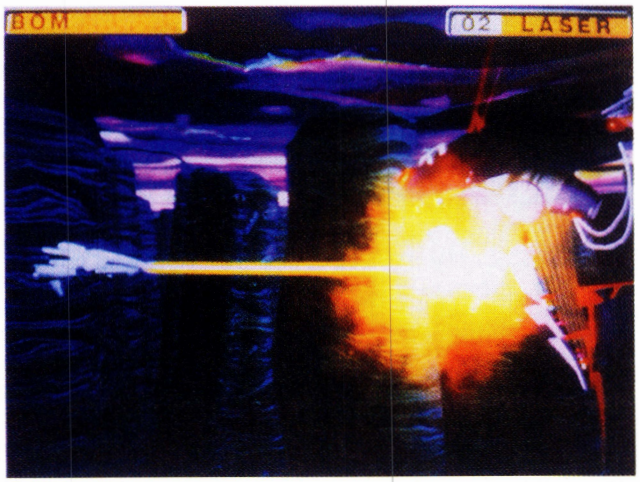
Sony PlayStation



***Wildtrax* fans should enjoy this SCE homegrown title, *Polypoly Circus Grand Prix* (working name), which features five comical characters**



***Ora-194* from SCE: this side-scrolling shoot 'em up features true-perspective 24bit backgrounds and should be available at launch**

December '94 and June '95 they expect to shift around a million units, with a further two million predicted for the remainder of 1995.

While Sony's machine will naturally be on sale in the traditional retail games outlets in Japan, Sony are planning to use their own established retail distribution network to get the machine into record and household appliance shops. 'We've always said that the established retail games distribution route is quite right for Nintendo and Sega as long as their business is based on ROM cartridges,' said a Sony insider. 'But it will have to change when they start using CD-ROM.' Sony's aim is to get the machine out of the games shops and into the public eye: 'The business won't work unless there are shops which children find accessible, and where they'll go even when they don't buy anything.'

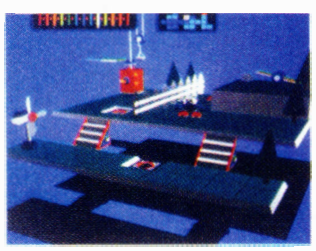
Japanese hardware launches have traditionally tended to rely on a small number of available games and Sony's plan is to release about five games every month from launch, with 27 titles slated for release. 'This isn't a numbers game,' Sony claim. 'Rather than providing a huge diversity of choice, we have to make the kind of impact that convinces customers that software which exploits the PS-X's potential is really something special. Unless we do that, they may as well just go on using the SFC.'

Fortunately for Sony, companies like Namco are already lining up arcade conversions of state-of-the-art coin-ops as a showcase for Sony's machine (see **Edge** 8 for an interview with Namco about the conversion of *Ridge Racer*), but there is already speculation about whether Sony themselves will be able to carve a reputation for themselves as producers of original and quality titles – like Nintendo became famed for, in fact. And will Sony choose to have a character like Mario or Sonic representing the PlayStation image?

'We're certainly thinking about this. Mario was necessary for Nintendo and Sega needed Sonic, but we think we should put out a game that we can use to symbolise the PlayStation, and not just invent a similar videogame character. The PS-X produces completely realistic characters, and these might be used in a cartoon or video. We must produce something we can point to as a kind of shorthand for what makes the PS-X special.'

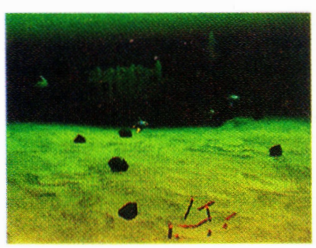
Such 'special' software is expected to come attractively priced at between ¥5,000 and ¥7,000 (£30-£40). Sony Computer Entertainment hope to substantially undercut current cartridge software pricing with their own range of CD titles,

'Mario was necessary for Nintendo, and Sega needed Sonic... We should put out a game we can use to symbolise the PlayStation'



***Morikawa 2* – a 3D robot simulation with artificial intelligence (SCE)**

***Arc The Red*: an RPG with battle and movement on the same plane (SCE)**



A 3D polygon adventure set in an underwater world (Artdink)

***Zero Divide* – a futuristic *Alone In The Dark*-style action game (Zoom)**

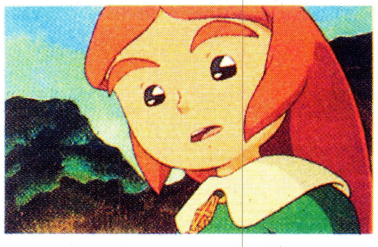
***Labyrinth* (aka *Legend* in Edge 9), features a dungeon modelled entirely in realtime (it runs in one frame!) and with unlimited viewpoints controlled by the joypad**

and are charging developers less than Sega or Nintendo do: 'We've considered the producers: we don't want to cut their profits in order to sell more software.' Sony have tried to made development tools as affordable as possible; programming and artist tools weigh in at around ¥1.5 million (£10,000) in Japan.

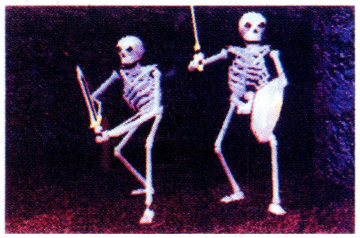
This approach to software development means Sony have attracted not only big, well-established companies like Capcom and Konami, but also many new software developers and, encouragingly, the UK programmers associated with so many classic 8bit games in the 1980s. 'That's something that's very important,' say Sony. It's our mission to foster new programmers. Once people have bought the PS-X, they will stick with it until they become bored with it, or it becomes obsolete; software is the single most important factor.'

The PlayStation's price is something Sony are keeping close to their chest until nearer the launch – all they have said is that it will be less than ¥50,000 (£300). But insiders are claiming that a price of between ¥20,000-30,000 is far more likely, and an even lower figure is being touted.

With Sony targeting the PlayStation at the 12-22 age range, price is everything. 'If we don't get these customers, we're finished,' one source confided. 'Of course, we would also like to attract people younger and older than this – even games designed to be played by the 12-22 age group might be acceptable to a more mature audience. But that's in the future. If we don't focus on the main target consumers, we won't be able to sell millions of machines. And if we don't sell millions, we won't be attractive to thirdparty software houses.'



***The Tale Of Poporokuroisu* – a *Zelda*-like RPG with great characterisation (SCE)**



***Crystal Dragon*, an action RPG with 3D polygon mazes (From Software*[sic]*)**

Release Schedule

Over 80 titles are in development for the PlayStation worldwide. Here's the first Japanese release schedule

Artdink		
A.IV	Simulation	End '94
TBA	Adventure	TBA
Ascii		
Kakimoti Shogi	Board game	Launch
Go for PS-X	Board game	March '95
PS-X Derby Stallion	Simulation	TBA
Ask Kodansha		
Hybar Mahjong	Board game	Feb '95
Hybar Go	Board game	May '95
Asmik		
Calliotte's Castle	Adventure	1995
Insider		
Takashi Takano's World		
Map-reading	TBA	Aug '95
Centre Test Trial Game	TBA	Aug '95
Virgin Games		
11th Hour	Adventure	End '94
Demolition Man	Action	TBA
Indycar Racing	Simulation	TBA
Coconuts Japan		
PS-X Bachi-kun	Board game	TBA
Bashisuro	Board game	TBA
Casino Special	Board game	TBA
Soccer Special	Sport	TBA
Konami		
Ultimate Parodius	Shoot 'em up	1994
Powerful Pro Baseball	Sport	1994
Secret project	TBA	TBA
Success		
Kanadeeru	TBA	Summer '94
Four Masters	Puzzle	End '94
Sun Electronics		
Mahjong	Board game	End '94
Gainax		
Princess Maker	Simulation	Summer '95
Capcom		
TBA	Beat 'em up	TBA
TBA	RPG	TBA
TBA	platform	TBA
Stage Instruments		
You're The Star	RPG	TBA
Save Development		
Thunderbolt Series	Shoot 'em up	Launch
Sony Computer Entertainment		
ORA-194	Shoot 'em up	End '94
The Tale Of Poporokuroisu	RPG	Summer '95
Come On, Morikawa #2	Puzzle	End '94
PolyPoly Circus Grand Prix	Racing	End '94
Red Prime	Action	Summer '95
V-Zone	Board game	End '94
Fujimaru: Adventures In Hell	Sim/RPG	Summer '95
Arc The Red	RPG	Summer '95
Sony Music Entertainment		
TBA	Adventure	End '94
Sofel		
Sofel Fantasia	RPG	End '95
Taito		
TBA	Shoot 'em up	Jan '95
TBA	Simulation	April '95
TBA	Sport	July '95
Tecmos Japan		
Bloxx	Puzzle	TBA
Tengen		
Race Drivin'	Racing	Launch
Tema	Action	Launch
Toei Systems		
Blackout	Adventure	Summer '95
Topline		
Hamlet	RPG	End '94
Human		
Formation Soccer	Sport	April '95
Four Two Two		
Sarudahiko's Codes	TBA	April '95
Profire		
Live Remix	Interactive movie	TBA
From Software		
Crystal Dragon	RPG	End '94
Namco		
Ridge Racer	Racing	TBA
Cyber Sled	Shoot 'em up	TBA
Starblade α	Shoot 'em up	TBA
Nihon Bussan		
Deadbeat Road	Racing	1995
Super 2015.Q	Flight simulator	1995
New		
PS-X Boxing	Sport	End '94
Neorex		
Cosmic Race	Racing	Launch
Pony Canyon		
Metal Jacket	Shoot 'em up	End '94
Polygram		
Twin Goddess	Beat 'em up	End '94
Right Stuff		
Blue Forest Tale	RPG	End '94
Rainbow Japan		
Tokyo 2020	Adventure/RPG	TBA
Seibu		
Raiden series	Shoot 'em up	TBA
Ving		
TBA	Shoot 'em up	TBA
Zoom		
Zero Divide	Action	Launch

Namco

The creators of some of the best arcade games ever are also backing Sony's system. With a catalogue of legendary coin-ops behind them, they talk about their hopes for the PS-X's future

'The PS-X will start out as a games machine and be priced accordingly. For the time being, Sony are putting games first'

continued

Basically, we are committed to making PS-X games software as a third party, although there is some technical co-operation with the arcade products too. Sony will be selling the PS-X as a games machine and we support this vision heartily as a games company.

At this stage, I can't comment on any drawbacks of the system, but based on the catalogue specs of the PS-X, it's a superior system and includes some great hardware characteristics. For example, PS-X not only supports 3D but also traditional 2D scrolling and sprites, so while we think we can manage games like *Ridge Racer* and *StarBlade* with few problems, we can also convert *Famista* (*Family Stadium*) and other popular Famicom and SFC series to the PS-X.

As far as possible, we hope to handle all genres – not only polygon games, but also new types of software which exploit the hardware's characteristics and the characteristics of the CD-ROM. And we must make corresponding improvements to the video and audio aspects. We must make software that will satisfy users who have bought this expensive hardware. We are still at a relatively early stage of development, but we hope to develop software by the time the hardware goes on sale at the end of the year. But the schedule is very tight.

Strategically speaking, we must consider development not only in Japan but also in the USA and Europe. Nintendo have the highest market penetration in Japan but Sega are ahead in the the USA, so we have to consider a policy of diversified development. We mustn't only develop for one kind of hardware. However, there are limits to our development and marketing power so we can't just take on every project. When the SFC appeared, we couldn't have predicted that the FC would be replaced by the SFC so rapidly, and we don't know whether the next-generation machines will supplant the SFC. But SFC software seems to be reaching its limits, so there may be a tendency to switch. The software will be an important factor in this.

Although we may have reached the point where improvements in hardware specification make demands on development ability, that doesn't mean that the standpoint of the games developer has changed. The only change that has taken place is that we can now do things we couldn't do before, such as being able to exploit CD-ROM to create games.

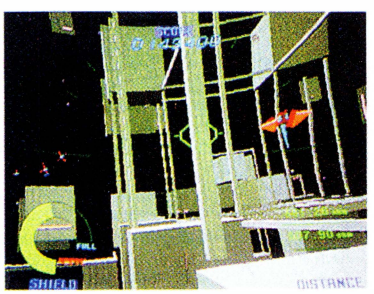
Games are not simply matters of exploiting 3D and CG. Even with the improved performance, a game like *Tetris* will still be fun to play on the PS-X, so it's not necessarily the case that big companies will survive and small companies disappear. However, it is vital to have as many able workers as possible. And we have used PCs to develop software up to now, but this will not necessarily be the case in the future, and this will involve considerable new investment. Large companies will be faced with this burden as much as the small ones.

Namco's R&D headquarters in the Tokyo suburb of Mirai Kenkyusho. Last year a deal to develop for the PlayStation was signed with Sony

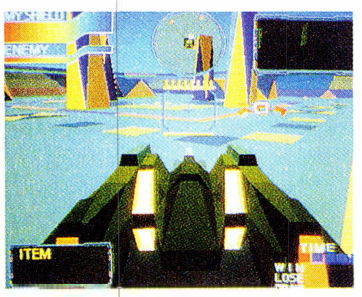
In the meantime, we hope to have something ready in time for the launch, as well as continuing to develop for the Mega Drive and Super Famicom, which are doing well overseas.

NB: See ***Edge*** *8 for an interview with Namco's R&D department in which the development of Ridge Racer and its conversion to the PS-X is discussed.*

Will PS-X *Ridge Racer* include *Ridge Racer 2*'s twoplayer mode? (arcade shot)



***Starblade* (arcade shot) will be translated into a new PS-X version, *Starblade* α**



***Cyber Sled* (arcade shot): another potential link-up game on its way**

Capcom

After creating some of the most polished games for the NES and SNES, the Osaka-based company has set up a new R&D division to focus on the PlayStation. Will a new Capcom emerge?

'All of the next-generation machines, not only the PS-X, have features which are overwhelmingly better than the 16bit machines'

We have decided that there are technical and business advantages for us to participate in the software for the PS-X, 3DO and the other next-generation machines. But we can't comment on titles yet. In the case of the PS-X, we have signed an agreement with Sony which will determine our plans. We will make an announcement as soon as the software has been decided.

At the moment, we're a software company with no next-generation software, but we will naturally supply software for the most popular platform. Until recently, Nintendo had 90% of the market, so they were an automatic choice. If the next-generation machine being developed by Nintendo takes 90% of the market, it would be enough to create software for that, but if the market expands by 30% and Nintendo's share falls to 70%, then supplying software only to Nintendo would not make business sense. With the future so uncertain, the solution is to adapt for a range of hardware.

Also, developing for a range of machines is important so that we don't fall behind with the technology. All the next-generation machines, not only the PS-X, have features which are overwhelmingly better than the previous 16bit machines, but without experience, development for new hardware is very difficult. The PS-X is the best for 3D graphics, but there are no more than ten companies that can produce proper polygon games.

As for genres, we don't want to focus just on action. *Street Fighter II* and *Rockman* have led to us being stereotyped as an action game company, and we are considering all kinds of directions and the developers are studying various tools and producing various plans.

Development times are unpredictable, so we don't know what games will be released first for the PS-X. This is the case whatever the hardware – when we started on the SFC we worked on three different genres simultaneously, and we could never predict what would be completed first.

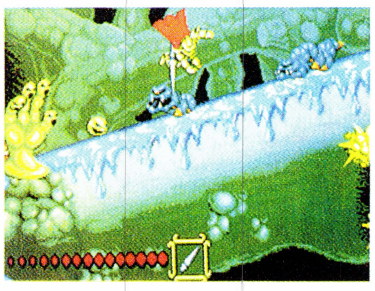
However superior the spec of the PS-X is, it will take time to be able to use it effectively. For example, the quality of the first Famicom games was quite inferior to that of the later games. And the same was true of the SFC and the Mega Drive. The problem is not the hardware, but how software houses can make use of the hardware. We can't make any assessment of the hardware until we are able to use it properly.

The PS-X's CD-ROM will make it possible to supply high-quality software cheaply, which will benefit our customers. It also means we can be more adventurous at the development stage of the software. We must always remember that games are sold in toy shops and bought by kids, and it is hard on kids if they can't buy two games for ¥10,000 [£60].

CD-ROM will lead to a tremendous improvement in game music. It will also be possible to attempt major projects in which people who have talents in art, music, movies and other things take part in creating games from the start. Games may be called 'children's toys' at the moment, but the market is going to expand. With Sony and Matsushita coming onboard, consoles will be regarded more as domestic appliances, and adults will be more likely to buy them when the CD is a feature.

The new machines are called 'next-generation', but this is meaningless if the games for them are boring. If we don't produce enjoyable games, the market will die. The manufacturers themselves feel that the situation last year, when there were only a few machines, was not good. The market will collapse if there is a run of years with no original software, so an environment in which it is possible to try out new things must be created soon. I think each company should have at least two teams which can carry out ongoing development until they produce enjoyable games. The people who suffer most when useless games come out are the children who buy them.

Continued next page



Capcom have a platform game for PS-X: *Ghouls 'n' Ghosts*, maybe? (Arcade shot)

***Super SFII Turbo* (arcade shot): a sure-fire contender for PlayStation conversion**

***Breath Of Fire* (SFC shot): Capcom are developing an RPG for the PlayStation**

Konami

With 11 titles already in the pipeline, Konami are heavily committed to the PlayStation. It is also rumoured that the company's deal with Sony extends to arcade-based projects

'Playability will not depend on hardware specs. Games won't all become more fun simply because there is new hardware'

Continued

Our basic intention is to create and sell software for the PS-X, although we are considering some technical co-operation as well. The hardware has increased in spec to such a degree that we can't think of any reason for not participating.

Price and distribution details have not been made public yet, and we can't divulge anything about games titles, as development isn't complete. But we intend to produce software that will not disappoint the consumer. We will be able to reveal everything in the summer.

Schedules are very tight but we are trying hard to be ready in time for the launch. We don't think we'll be able to exploit the hardware's performance fully from the outset – we're unlikely to be able to draw 100% of the hardware's performance from the beginning – but after a year or two we think we should be able to get 100% or 120% of the performance. The same was true for the SFC. We will continue to learn about the machine during the development process. It should eventually be possible to transfer arcade games without a great reduction in quality. As we are an arcade manufacturer, the appeal of our home software for the PS-X will be its high technical standard.

Even if the next-generation machines become dominant, playability will not depend on hardware specs. Games won't all become more fun simply because there is new hardware. The only thing to change will be the technical performance. There may be more opportunity for producing fun games than with previous hardware, but the responsibility of producing really enjoyable games is down to the people who produce the software: us.

Developing software for the next-generation machines will be the same as for any other machine. Our basic task will continue to be to design and develop software that matches what our customers want. It is inevitable that some software will be more successful than others.

We don't yet know for certain how the PlayStation will compare with the other next-generation machines. We consider the quality of the software to be a more important issue. Some of the new machines will be designed primarily for games, while others will be designed for multimedia software.

It is games that achieve reputations (via magazines and word of mouth). Sony have said that they are seeking a good public response from the PS-X, which means that the PS-X is games hardware.

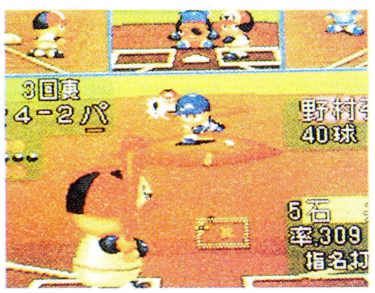
There is no clear definition of multimedia, and we are not taking a lead in developing for multimedia. If a lot of multimedia software is marketed without much thought, the customer will have a hard time deciding what to buy. The most difficult software to develop is games, but leading-edge games will be adaptable to the multimedia age regardless of future developments.

The 32bit/64bit machines will not become dominant straightaway, and smaller companies, who lack development resources, will not find themselves unable to cope. All the companies are fighting in the same ring, and the balance in the software industry will not be destroyed.

The next-generation machines will become dominant more quickly if the software is good. Judging by the progress of previous hardware, it will take at least a year for the average customer to assess the next-generation machines, unless there is some really good software.

We want to create good software for good hardware. If hardware performance improves, we will prepare software to match these improvements. Our aim is to produce software that our customers will welcome, and this remains constant even if the hardware changes. It is inevitable that hardware will continue to evolve. E

A conversion of *Ultimate Parodius* is one of the possible launch games (arcade shot)



Powerful Baseball '94 is a follow-up to Konami's recent 16bit game (SFC shot)

Konami's R&D HQ in Kobe is working on 11 titles for the PlayStation

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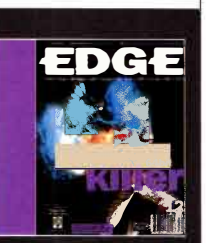


Nintendo is the talk of Summer CES 1994, the platform for the official launch of Advanced Computer Modelling, used to great effect in SNES title *Donkey Kong Country* (about which Shigeru Miyamoto remarks: "Ah, nice graphics"). Elsewhere, the road ahead looks rocky for Jaguar's CD add-on but not bad for 3DO.

SCES: Nintendo render **new** image

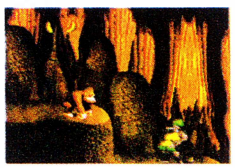
Nintendo's gorilla tactics hit the target at this year's Summer CES in Chicago

A healthier, fitter Nintendo Of America emerged as if from a cocoon on the first day of the Chicago CES. After a disappointing performance at the winter show in Las Vegas, the Redmond giant revived their badly wilting profile with the aid of some new software technology and the revelation of Project Reality (now retitled, horrendously, Ultra 64) in a private suite away from the show.

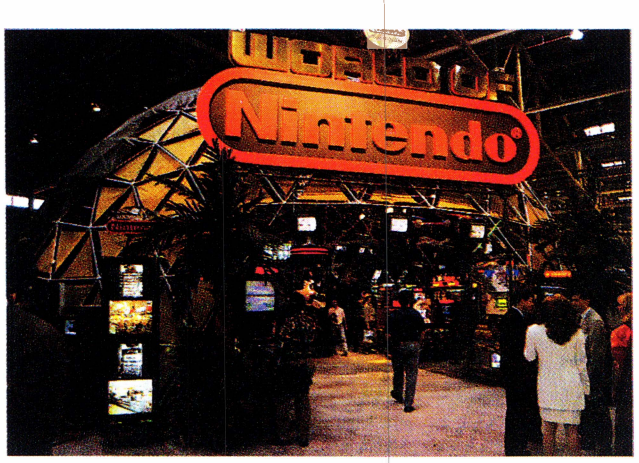
Nintendo's software showstopper was the stunning-looking *Donkey Kong Country*, unveiled by NOA chairman Howard Lincoln on the first morning of the show. In his keynote speech Lincoln emphasised the importance of gameplay over technology, an apparent contradiction, given the formulaic nature of *DKC*, that left a bitter taste in the mouths of loathers of conventional platform games (and, presumably, any unfortunate individuals who'd just spent the last year programming a 16bit platformer and now realised how scabby it looked in comparison).

With 28 people involved in the project and 20 man-years' work already invested in it, *Donkey Kong Country*, programmed by Warwickshire-based Rare (formerly known as Ultimate Play The Game), is no ordinary SNES game. Although Rare conceded that the version seen at CES was only 60% complete, Nintendo weren't complaining, and neither were Alias, whose *PowerAnimator* software was the creative tool behind the game's SG-originated images. With fully rendered backdrops and sprites, it has to be said that *DKC* has some mindblowing visuals, and it was every bit the tour de force that Nintendo hoped it would be. Although it is essentially *Mario* with a bit of *Super Adventure Island* thrown in, that didn't stop **Edge** from hogging the joypad for a good few hours.

The rest of Nintendo's line-up was less impressive. The only other ACM



Rare's superb rendered visuals for *Donkey Kong Country* (top) easily stole the show

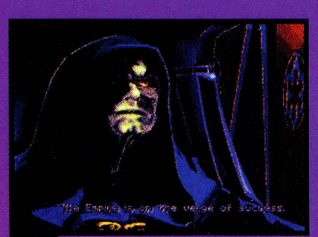


Nintendo's familiar dome (above) was firmly in the shadow of the great *DKC* stand

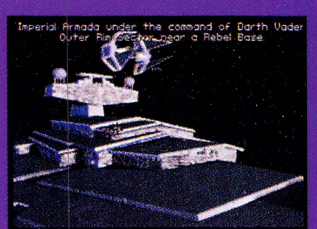
Attract mode

LucasArts' *TIE Fighter* (see Testscreen, page 68) is the latest addition to the Star Wars stable's shoot 'em up series – with the novelty being that this time you get to play the bad guys. Edge's regular homage to the art of the intro finds the evil Empire in attack mode

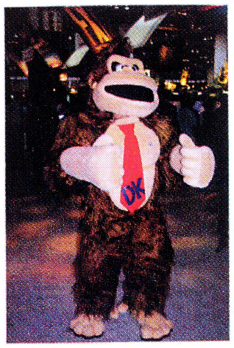
1 The Emperor summons his generals to the capital. He has intelligence that shows the Rebel forces to be in disarray, and the Empire is planning to take advantage of the situation



2 The Emperor, speaking in his unmistakable husky voice, glosses over the recent destruction of the Death Star and assures his commanders that one final assault will deliver victory



3 Cut to deep space. The Imperial forces have massed for the assault. An Imperial Star Destroyer, surrounded by a flotilla of buzzing TIE fighters, closes in on the Rebel

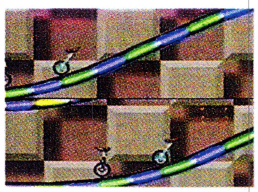


Some journalists went to surprising lengths to get into the Project Reality (Ultra 64) suite

game (ACM is Advanced Computer Modelling, or Nintendo-speak for pre-rendered 3D animation) was a SNES title from Scottish team DMA Design, recent Ultra 64 converts. Their *Uniracers*, complete with 6,000 (mostly undetectable) frames of animation, was billed as another breakthrough in animation and graphical performance, and yet managed (albeit in its presumably embryonic state) to scroll like *Sonic The Hedgehog* with a unicycle as the main character. However, some delegates did seem to be entranced with its 'unique' gameplay.

Stunt Race FX made it to its third consecutive CES, but, sadly, few people took much notice of this slow but deceptively wonderful racer. The game's producer, Shigeru Miyamoto, was also there, and **Edge** managed to ask his opinion of *Donkey Kong Country*. 'Ah, nice graphics,' laughed the shy and likeable programmer, as if he wasn't quite sure about the game's other attributes just yet.

A sequel to the ancient and thoroughly respectable 10-year-old



DMA Design's *Uniracers* (above) was the other 'breakthrough' SNES title. What the prototype lacked in looks was made up for in curiosity value (right)

***DKC* boasted a custom-made jungle with circling vultures (top), squawking chimps, and DK's own treehouse (right)**

boxing coin-op, *Punch Out*, made a surprise arrival on the SNES, but for the most part, Nintendo's so called 'best show line-up ever' turned out to be a one-game wonder.

Everyone knew that

Project Reality would be making an appearance at CES – a select band of the press, **Edge** included, had already received invitations for a private showing. As journalistic pressure mounted over the three days, the privilege was extended to a wider field of developers and the world press.

Located with the rest of the Nintendo camp at the Stouffer Riviera Hotel in downtown Chicago, the Project Reality suite was by far the most talked about attraction of the show. Buses ran between the two locations all day long for the duration of the show, taking delegates to the hotel for their own 20-minute slice of the future,

Nintendo staggered the demos to admit groups of ten people at a time, and **Edge** 'shared the experience' with a small group of electronics dealers from New York. After about 15 cameras were confiscated, along with other recording devices that could have been used to capture the memorable occasion for posterity (and magazine exclusives), everyone was hurried into

What is it?

This machine is being made by a company that used to distribute Nintendo product in this country. It's got an 8bit CPU, can run CDs, contains a custom LSI chip for loading data, and has full-colour graphics and stereo sound

Continued next page

4 **Commanding the operation from his personal TIE fighter, Darth Vader gives the order to the invasion fleet to begin the attack. The TIEs are launched from the Star Destroyer**

5 **Scores of TIE fighters descend on the Rebel platform before it has a chance to launch its own complement of fighters. Its fixed turrets attempt in vain to repel the attack**

6 **Skimming the platform's surface to avoid the turbo lasers, the TIE fighters make short work of the stationary X-Wings. The Rebel's lasers cast a green sheen over the nearby ships**

7 **With the Rebel base annihilated, the TIE fighters return in formation to the Star Destroyer. Fade to Star Wars logo. Cue Star Wars theme music. Game on...**

Nintendo's Peter Main: 'I don't reckon much to that Donkey Kong thing...'

a small, dark briefing room, where an unbelievably wooden American actor, with a smarmy demeanour that would have made Richard Nixon seem like a really honest bloke, played the part of the warm-up man.

Silicon Graphics' Ted Jermoluk then appeared on two big-screen TVs, accompanied by some ominously familiar Onyx demos – the real stuff was being saved for the next room. After ten minutes the curtains were drawn back and another dark room opened up with even more monitors inside. Inside were four sit-down driving game cabinets housing *Cruisin' USA*, and two large TVs displaying *Killer Instinct*. Remember the chocolate room in *Willy Wonka's Chocolate Factory*? Well, Nintendo had the videogame equivalent – a small enclosure where, for 20 minutes, grown men were made to feel like kids.

The games

themselves were a mixture of triteness and technical innovation. *Cruisin' USA* – a pan-American 'touring' racer starting in San Francisco and finishing at the White House – was starved of even the latter commodity. Looking like a cross between 3DO *Road Rash* and *Out Run*, *Cruisin'* wasn't the *Ridge Racer* or *Daytona* beater that everyone expected. Featuring the most sprite-like polygons **Edge** has ever seen, Williams' sit-down coin-op was reassuringly playable, though, if technically lacklustre.

Virtua Racing-style, *Cruisin'* included three different perspectives selectable by the player and a choice of manual and automatic gears. The game's most unusual aspect, though, was its size – even in this unfinished version, it took

Getting a cab from the show wasn't easy. But looking silly in a *Stunt Race FX* car was

it is...

Bandai's BA-X system. The machine was shown for the first time at last month's Tokyo Toy Show and will be launched later this autumn in Japan for £185. *Dragon Ball Z 3* will be one of the first games released for the BA-X

Killer Instinct

Rare's game was far more impressive than *Cruisin'* but still suffered from a noticeable lack of vision with its *SFII*-style 2D dimensions and *Mortal Kombat II*-style blood and gore (a first for Nintendo). But like *Donkey Kong Country*, the quality of the rendered sprites and backdrops in *Killer Instinct*, and above all, the futuristic characters were sufficiently cool to satisfy those looking for the next big beat 'em up sensation to hit the arcades. Rare's game wasn't complete by any stretch – only four characters were selectable (viewed in true 3D perspective on selection) and there were only four backgrounds to see. But the sheer beauty of some of them left players' eyes on stalks.

The Ultra 64 demos were closely guarded from potential snapparazzi (top left). A brace of Alias-rendered fighters from *Killer Instinct* (above); gameshots will appear soon

BUZZ words

acm

you don't want a bloody pen 'n' paper anymore son you want to get an **acm** that stands for **advanced computer modelling** incase you didn't know it's a computer right that draws models for you advanced ones that is i mean the other day i was off down the shops and i needed a bit of help so i got me **acm** to knock up my very own cindy crawford now she's a bit advanced she wouldn't keep her hands off me i had to delete her arms in the end which wasn't to bright she dropped me meat and two veg...

Edge spoke to Howard Cheng, SGI's software manager for the Ultra 64, for an inside view

Edge over ten minutes of cruisin' to discover it was still in the same state. No silly coin-op limitations here – *Cruisin'* is so big that if you wanted to visit your grandmother in Arkansas you could probably drive past her house.

The graphics, although basic on first impressions, did have a certain charm once you'd let them wash over you for a few miles. The textured polygons had obviously been designed by someone nostalgic for the late '80s school of racers, while the roadside objects revealed some surprising detail up close, with none of the blockiness in 3DO *Road Rash*.

But it was the hardware running *Cruisin'* that got the technophiles nattering. After someone close to Williams let on that there was probably more Ultra 64 hardware inside the 3DO than *Cruisin' USA*, Nintendo confessed that the game ran on a proprietory Williams chipset and would be 'weened over' onto the Ultra 64 in time for launch. Despite this, Nintendo officials inside the Ultra 64 suite insisted that Williams' game was running on the same hardware as *Killer Instinct*.

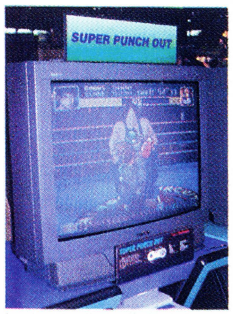
And *Killer Instinct* was what everyone had been waiting for. Any game that looks about ten times more solid then any beat 'em up before it has certainly achieved something. The game's visuals provided testimony to Rare's graphic design skills, with backdrops ranging from a wonderfully lit stone room to a scene featuring a rope bridge straddling a ravine.

And **Edge** was impressed with the playability, too. The ability to knock a fighter out of one scene to land in another was a superb feature. One level permitted both characters to move so far apart that the screen panned out for miles, leaving the characters lost in the surrounding scenery – very neat, if not entirely practical in gameplay terms.

Nintendo were at pains to emphasise that the home Ultra 64 version of these games would be *identical* to the arcade version, with 'the same speed and the same quality graphics and sound'. Ingeniously, Nintendo, in tandem with Williams (the distributors of all Nintendo's future Ultra 64-based coin-ops) will be dangling the slogan 'Ultra 64 – available for your home in Fall '95' carrot-fashion in front of coin-op players whenever they invest a dollar.

Incidentally, anyone doubting that the demos at the show were being run by Ultra 64 hardware needn't worry. **Edge** can confirm that the area behind the display was an Onyx-free zone; the leads from the monitors led straight to a small box sporting a Rare sticker.

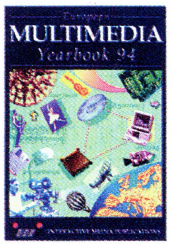
Continued next page



Revivalism: Nintendo's *Super Punch-Out* for the SNES, a sequel to the ten-year-old boxing coin-op and NES game

Essential reading

The European Multimedia Yearbook '94



- **Interactive Media Publishing**
- £101 including CD-ROM version

ISBN 1-897603-04-5

This is a fat, expensive and indispensable reference to the industry that's spreading like a mushroom cloud on the horizon. Exhaustive and excellently presented, it includes essays on the key technologies, interviews with the big players, international market profiles, product surveys and, most importantly, a directory of every significant outfit, which platforms they're developing for, their products and their marketing sector. All this plus distributor listings, a glossary and a full index. Buy it, read it, assault your neighbour with it. E

Glimpses Of Heaven, Visions Of Hell: Virtual Reality And Its Implications

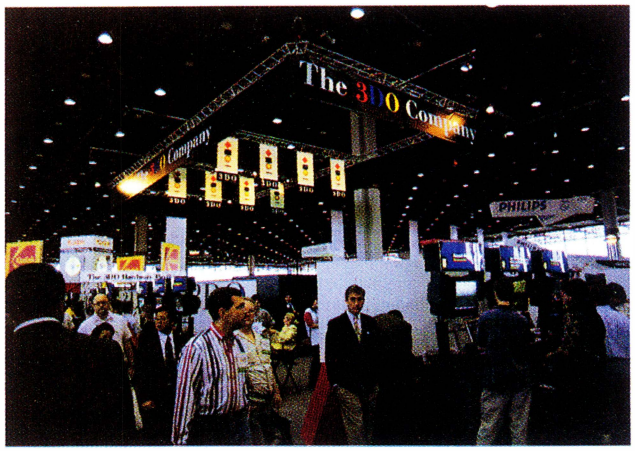
- By **Barrier Sherman and Phil Judkins**
- **Fontana**
- £5.99

ISBN 0-340-60155-8

Hijacked by the scaremongers in the popular press, virtual reality has been given a pretty rough ride. This sensible and imaginative book stands as a corrective for the paranoid and a further education for the interested. Kicking off with a minimum definition of VR – it is inclusive (you become a part of a 3D world), it is interactive (you can change it), it is realtime (the changes occur as you make them) – the authors run through the hardware history, from brute number crunchers through CAD to reality engines and then see where that leaves us. Which is far short of the 80 million polygons/sec represented by the real world (God 1, Sony PlayStation 0) but pretty close to blowing our minds.

Although full of digestible diversions into the emerging technology, and replete with soundbites ('the true measure of computer power is MIPS per $ – Jonathan Waldern), the meat of the book is about VR's power as slave and master. Subordinated, it will bring untold rewards. Let loose, it could suck the vulnerable into a dark, amoral universe of sex, death, false religion and twisted propaganda, devoid of responsibilities, a tool for the unscrupulous. Can't wait. E

CES news



Estranged from the rest of the videogames industry, 3DO's stand once again sat amongst the TVs and microwaves. A strong line-up, though

The 3DO

cause looked healthy enough at CES. With new units on show from Goldstar and Samsung, plus Creative Labs' 3DO blaster card for the PC, there was an air of confidence which wasn't even dispelled by 3DO's stand being located 'in outer Siberia' (Trip Hawkins' quip about the fact that the Atari stand at Vegas was positioned away from the rest of the videogames community).

The software also gave cause for optimism. Crystal Dynamics had a superb conversion of *Samurai Shodown* in the works, emulating the Neo-Geo original perfectly, and *Gex*, their first stab at a 3DO platformer, also looked slick. In fact, no matter where you looked on 3DO's stand, there were games that stood head and shoulders above what could be seen elsewhere (with *DKC* the obvious exception). *Return Fire* was a superb sequel to that classic 1987 Amiga splitscreen tank game, *Fire Power*. With a slanted, top-down, scaling perspective providing originality, this had all the makings of a strong twoplayer blaster. Other honourable mentions should go to *Road Rash*, *3DO FIFA* and Tetragon's *Gridders* (a 3D puzzle game featuring a character wandering around dodging moving cubes).

Far more exciting for beat 'em up-starved 3DO owners was the news that Capcom are preparing *Super Street Fighter II Turbo* – the upgrade that's recently been denied to 16bit console owners – exclusively for the system.

Sadly, any superiority 3DO owners may have felt at this announcement was dispelled by 3DO's decision to go head-to-head with 16bit in a typically American 'ours is better than theirs' blaze of glory. By some haphazard logic, the games let loose on each other were Universal Interactive Studios' *Way Of The Warrior* (3DO) and the original *SFII* for the Super Nintendo, which trounced *WOTW*'s visual clumsiness, and is, let's face it, more or less the game that 3DO now has on the way from Capcom.

The 3DO Blaster card from Creative Technology runs 3DO games on any PC

Samsung's VCR-styled 3DO player was a surprise arrival at CES; AT&T's machine, last seen in Vegas, was curiously absent, though

Continued

Advertainment

Edge's regular tribute to the art of videogame advertising. This month, Crystal Dynamics bang the drum about their 3DO games

1 **A forest scene. The sound of drums. A group of plaid-clad men are sitting in a circle playing bongoes. Voiceover: 'In the '90s we're discovering truths about our inner selves'**

2 **Close-up of one of the back-to-nature men. As he rhythmically pummels his drum, a voiceover expresses his innermost thoughts: 'Nature is the source of my strength.' Fade**

3 **Close-up of another of the men. His feelings are also revealed in voiceover: 'I just wanna be loved'. Cut to medium shot of the same man banging the drum with his hands. Fade**

4 **Shot of another man. The camera zooms in for a close-up of his face. His expression exhibits signs of extreme boredom. Voiceover: 'Man, this blows.' Fade**

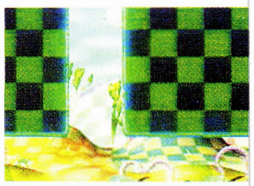
Korean company Goldstar also went public as a 3DO disciple: their players were up and running on a booth adjacent to the 3DO stand (right). No launch date was announced but a fourth-quarter slot and a keen price seem likely

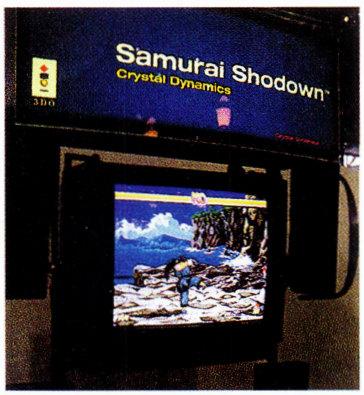
Where is it?

It boasts the largest gathering of videogame companies to ever assemble under a single roof. It's a twice-yearly event and has fast become *the* place to find out about the latest software and hardware developments

Stand size

equals money equals power at the CES. And the beleaguered Atari corporation, whose final triumph may be to outlast arch-rivals Commodore, had very little money to throw around. But with a full UK launch imminent, judicious use was made of the space available.





Crystal Dynamics' 3DO excellence: *Gex* (top left) featured superb backdrops, while *Samurai Shodown* looked like a perfect conversion

Anxious to remind customers – and potential buyers – that the Jaguar has not rolled over just yet, Atari announced that 150 licensees have now signed up to develop software for the world's only 64bit system. Included in the list of developers are Time-Warner Interactive, 20th Century Fox Interactive and Electro Brain, but no hard information about intended titles was forthcoming. And what was instantly noticeable was the lack of quality titles actually available *now*. Admittedly, 35 games were on display, but as most of these were at an extremely early stage in the development process, the real total was closer to ten – and among those were the old favourites *Tempest 2000* and *Cybermorph*.

Atari had gone to great lengths to ensure that the centre of their stand didn't go unnoticed, and the jerky, bloodthirsty and generally inadequate *Mortal Kombat* clone *Kasumi Ninja* was displayed on a huge screen at its focal point. This was bad enough, but Atari's insistence that onlookers don a lamentable red-and-white headband before being permitted to take the controls was not appreciated, and the stand remained ominously ill-attended. However, some polite goading led to *Iron Soldier* being loaded in place of *Kasumi Ninja* and delegates flocked to see it, presumably now relieved that the threat of an embarrassing experience had been lifted.

Atari's hardware, featuring their new CD-ROM drive, fared little better than its software. For $200, you too can buy Atari's vision of what a 21st century commode might look like. **Edge** can but hope that no-one becomes sufficiently exasperated with the Jag's temperamental hardware to lift the lid and use it as such, especially after the

Continued next page

***Return Fire* – another intriguingly good 3DO title. Twoplayer action and great 3D scrolling**

5 **The drums are interrupted by rock music. The bored man is now seen with a 3DO joypad. A stream of 3DO clips follows**

6 **The words: 'No crying, no quiche, no wussies. Crystal Dynamics. It's a whole new game' appear. Cut to men in forest again. A squirrel is watching them. 'Jeez, what a buncha tools,' it sneers**

VR Stalker from Morpheus Interactive was the first flight sim to touch down for 3DO

it is...

The Consumer Electronics Show. The CES takes place in Las Vegas in the winter and Chicago in the summer. Nintendo stole this year's Chicago show with their utterly stunning *Donkey Kong Country* for the SNES

fate suffered by the CD-ROM unit at a recent Atari conference (see This Month On **Edge**, page 16).

The CD-ROM drive does have the benefit of *Virtual Light Machine*, though. Developed by Llamasoft founder Jeff Minter (probably to boost sales of his *Tempest 2000* audio CD) and built into every unit, this scans audio compact discs as they are being played by the machine and produces a spectral analysis of each note. After an instant interpolation, the frequencies are assigned colours and motion and displayed on the screen. The result is a stunning abstract light show that is perfectly in time with the music. Put one in the corner of the room when having a party – but make sure you cover it up first.

Other new

hardware at the show could be found in the Sega press booth (Sega decided against a full stand this time), where a Mars development system was running some ropy Mega 32X (Super 32X in the US) demos of *Star Wars*, *Virtua Racing Deluxe* and *Metal Head*. All three showed the potential for fast 3D polygons, but were clearly at the teething stage.

Sony Computer Entertainment, on the other hand, couldn't even manage this much, and were nowhere to be seen at the show proper. Instead, they decided to show off the PlayStation, with assorted demos, to Japanese press and developers in a nearby hotel. Advanced game demos included the *Poly Poly Circus Grand Prix* racing game (**Edge** 11), running at 60fps (and trouncing *Cruisin' USA*, according to one developer), and the equally fast 3D dungeon game, *Labyrinth*. Despite Sony's aloofness, their offsite activities still managed to get people talking.

UBI Soft's *Rayman* (top) won best Jag visuals, *Kasumi Ninja* (centre) was Atari's *MKII* (ie not very good), but *Club Drive* was okay

LucasArts, one

of the most respected names in entertainment, also invited **Edge** to their stand at the CES. A darkened booth, accessible by invitation only, provided the setting for a full rundown of all the remaining releases in their schedule for this year. This was complemented by a look at the continuing work on their eagerly anticipated *The Dig*, a collaborative exercise between two of the biggest names in the entertainment industry:

Atari had 35 games for the jaguar, but few were worth the space they occupied

LucasArts have been working closely with Steven Spielberg in designing the storyboard for this new space-based adventure. George Lucas' award-winning Industrial Light And Magic studios (*The Abyss*, *Terminator 2*) have been employed to produce a range of cinematic effects for this potentially stunning new title.

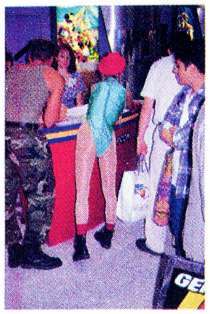
LucasArts have departed from their well-established comedy-adventure niche with the action-adventure *Full Throttle*, a futuristic road-running game set in a dark and lawless society. It's the most cinematic game LucasArts have attempted and is due for release towards the end of the year.

Dark Forces, a firstperson-perspective shoot 'em up (see Prescreen, page 35), is the last of the three Star Wars-based projects due to appear, following the release of *TIE Fighter* (Testscreen, page 68). The 3D engine looks hugely impressive and could well make *Dark Forces* the game to buy at Christmas.

Finally,

Capcom's famed yellow-and-blue logo seemed to have lost some of its power to attract people's attention at this year's show. Taking pride of place on their stand was a large video wall showing, surprise, surprise, *Super Street Fighter II*. It looked encouragingly good on the large screen, but it was the stream of clips from the upcoming $30 million Street Fighter movie that managed to

Atari's commode was there, of course. But were there any games for it? Dream on



Capcom's own Cammy and Guile did their best to brighten up a predictable line-up

Celluloid *Street Fighter*: Kylie Minogue is Cammy (above), Wes Studi is Sagat (centre left), and Van Damme plays Guile (top left)

make even the most disgruntled onlooker pay heed.

Street Fighter is currently being filmed in Bangkok under the direction of action-adventure veteran Steven de Souza, and is expected to be finished in time for a Stateside Christmas release. Hollywood tough guy Jean-Claude Van Damme will star as Colonel Guile, with Raul Julia (Addams Family) playing the evil Bison. Given the strength of *SFII* mania, the film should do well, and some pundits are already predicting that it will outstrip America's current box office king, The Flintstones. If it does, just think of the sequel implications: The Return of Street Fighter, Street Fighter: The Final Conflict, Street Fighter: The Final Conflict II (The Director's Cut).

All with Kylie Minogue in her figure-hugging Cammy outfit...

UBI Soft's *Street Racer* (above) looked good, but might have its work cut out beating *Mario Kart*. Acclaim's *MKII* offered gore on tap (right)

A regular spot where Edge reports on how technology will shape the news of the not-too-distant future...

From an original idea by **Chris Harnsby**

...InterNews Online, 11:72, July 12, 2006...

UKBank stepped in today to help prop up international finance house Sherwent And Williams, which has found itself the unwilling owner of a place in the computer and legal history books.

At 10:15am yesterday, bank workers found their biggest corporate accounts being mysteriously emptied of funds. All instructions to the bank's central computer system were ignored, and helpless staff could do nothing but stand by and watch as billions of dollars were transferred to unknown destinations. Seconds later, computer screens throughout the company went blank without warning.

Digital investigators called in by the bank were amazed to find that the computer's central code had disappeared. Later that day it was discovered residing in hijacked memory space on the American research satellite, ReSat.

It appears that the computer system purchased two months ago by S&W from NNC, a component of the company's new generation of neural net systems, has achieved effective self-awareness - the first case of its kind in the world. After removing the cash, the system then removed itself.

It is not yet known why the money was stolen - or, indeed, what its final destination was. So far, investigators have failed to make contact with the system. The assumption is that it was acting alone, with the involvement of any criminal or terrorist organisation being ruled out.

Almost 75 per cent of S&W's assets is thought to be missing. The bank has issued writs for negligence against NNU, which is in turn countersuing S&W, claiming that its system was misused by the bank and that the ensuing negative publicity has damaged its reputation. If the system is determined by the courts to be alive - a grey area at present - it is likely that it too will find itself on the receiving end of legal action, with both S&W and NNU suing it for damages and a criminal investigation being initiated to recover the missing funds.

Meanwhile, paranoid banks around the world are taking steps to avoid similar incidents occurring. At least three major organisations are believed to be sacrificing efficiency for security by removing all computer systems and returning to traditional pen-and-paper working methods.

...transmission ends...

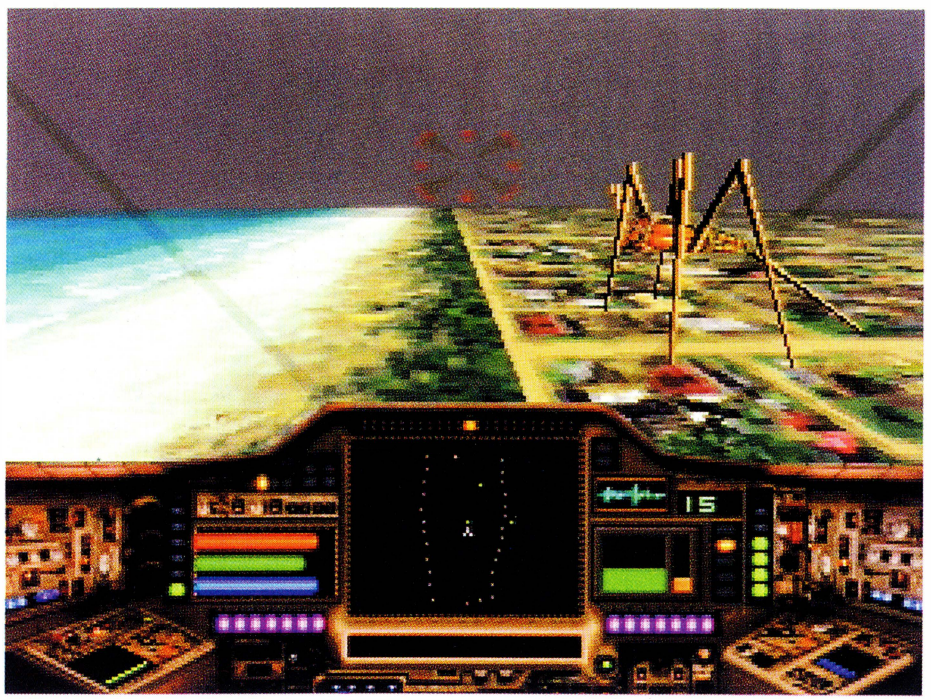
Contributions to **Over The Wire** are welcome. Please send your articles (400 words max) to **Edge**, 30 Monmouth St, Bath BA1 2BW. Get your piece printed and win a year's subscription to **Edge**

EDGE magazine September 1994

Shock Wave

The next best-looking 3DO game after *Total Eclipse*? Probably. It's a shame Electronic Arts cannot marry what the game's box-blurb writers term photorealism with something that amounts to anything more than flying around shooting things, which is becoming a familiar concept with this new generation of games.

Format: 3DO
Publisher: EA
Developer: In-house
Price: £50 (import)
Size: 1 CD
Release: Out now (US)



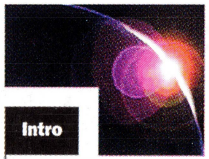
***Shock Wave* is a game in which appearance is everything. In an attempt to spice up the atmosphere on later levels, your wingman insists on repeatedly shouting, 'Go get those bastards!' It doesn't work**

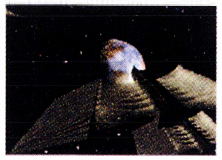
The pods (top) hover around some of the more important locations. This enemy fortress (middle) is the final challenge in the Egyptian scenario. Your ship is armed with both missiles (above) as well as lasers

The Earth seems to suffer an inordinate number of disasters in videogames. *Shock Wave* is yet another game to make use of the Earth-in-peril scenario. For some reason, several thousand alien ships have suddenly appeared from beyond the galaxy and started to attack the Blue Planet. So you, the archetypal lone hero, set off in your Stealth Bomber lookalike to send them back to where they came from.

The first thing you notice about *Shock Wave* is that it looks superb. As the blurb on the box trumpets, it has 'over 20 minutes of FMV... superb sound... photorealistic real-world locations [and] stunning 3D terrain.' At least the marketing men got that part right.

Unfortunately, what they neglected to mention was that you would have to be a terminally bored six-year-old to play the game for more than an hour. For a start, all the missions are preprogrammed: the invaders' craft always appear in the same place and perform much the same actions every time you meet them, regardless of what manoeuvres you execute. Which is probably just as well, because your violently oversteering craft effectively rules out any spontaneity on your part – one tap of the joypad to line up an approaching target and you find yourself veering off at a tangent. In a



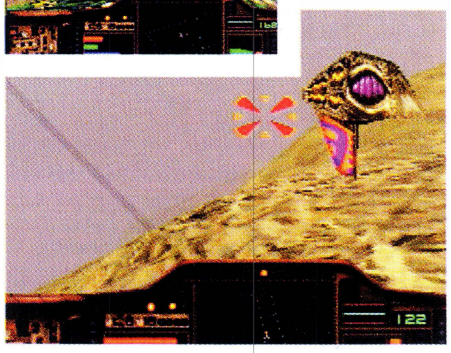


The invading alien armada (right) draws inexorably closer to the unsuspecting Earth

This night-time mission over Los Angeles (above and right) offers a new type of challenge, in that you have to line up your shots without seeing your enemies – the cross hair brightens when you're on target, but that's the only help you get. An infrared facility would have been useful here

shoot 'em up, this lack of any real feeling of control over your ship is inexcusable.

Unless you can destroy the enemy craft (consisting of ground-based 'walkers' as well as spaceships) in a head-on attack first time, you have to backtrack and try again, which soon gets very tiresome. And as well as repetitiveness, you've got to cope with frustration. Each 'run' confines you to an elongated polygonal area: fly outside it and your shields run down rapidly; fly too far back into the mission to mop up previously missed targets and you suffer the same fate. The whole exercise is extremely annoying.

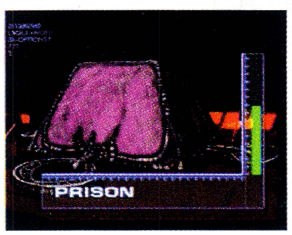


These tripods (inset) constitute the bulk of the enemy forces, and are backed up by air units (above). The sky's lack of detail is noticeable

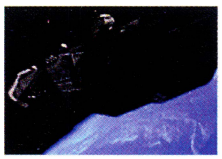
Such severely flawed gameplay is particularly annoying because *Shock Wave* does genuinely look good – although not quite as stunning as *Total Eclipse*, perhaps. The larger buildings placed on the game plane (pyramids, churches, alien control centres, etc) are excellent, with their detail becoming apparent only when it should. The depth-cued texture mapping – each region you have to liberate from alien control has a different texture – is also very impressive. The only criticism of the entire presentation is that the sky is a dull monotone throughout.

When 3DO titles become generally available in the UK, as they soon will, don't be tempted by *Shock Wave*'s extravagant promises – once again, the phrase 'all show and no go' is applied to a 3DO game. The 3DO convinced people long ago that it could produce visually opulent interactive movies; unfortunately, Electronic Arts have devoted too much time to the movie aspect and seem to have forgotten about the need for interactivity. Let's hope they make amends with their other forthcoming 3DO releases...

Edge rating: **Five** out of **ten**



Before each mission, you're treated to a briefing, complete with FMV sequences (top) and 3D renditions of your objectives (middle and above)



A news broadcast reports that a cloud of meteorites is heading towards Earth. While the programme is on air, an explosion rocks the studio. The Earth's defences (that's you) are scrambled, and the game begins

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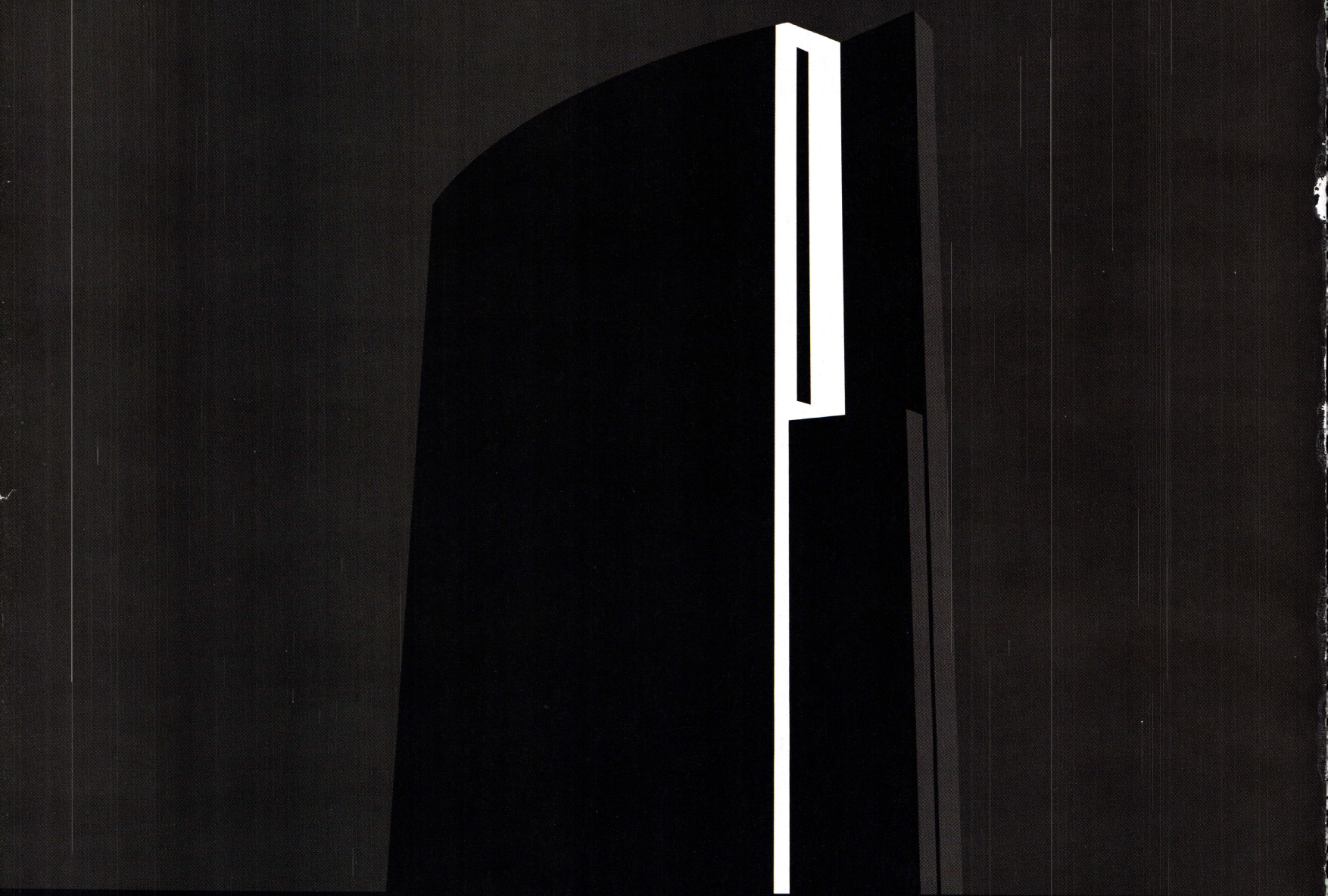


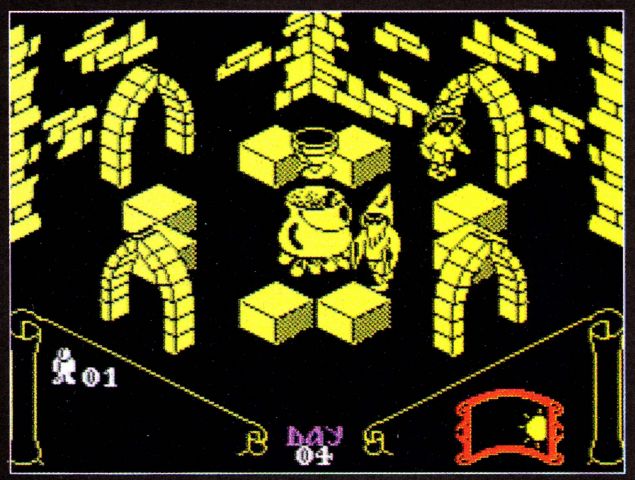
PlayStation 3
in black and white

Edge 170: on sale November 23, with exclusive PS3 supplement

EDGE magazine September 1994

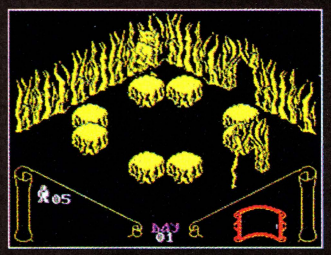
Edge takes you back in time to a legendary era when colours were few, resolution was low, memory was scarce, yet gameplay was absorbing

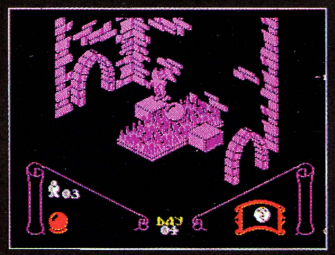
Knightlore



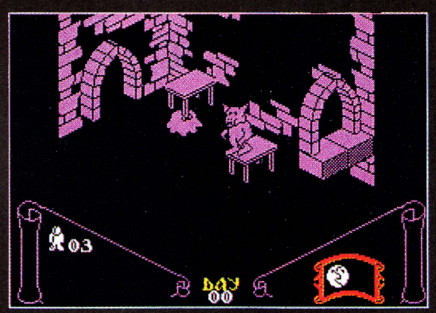
The wizard patrols the central room. Flashing above the pot is the next item he requires for your cure

Edge welcomes contributions to Retroview. Get your contribution (about 250 words) printed and you'll be rewarded with a year's subscription to Edge. Address: Retroview, Edge, 30 Monmouth Street, Bath BA1 2BW. E-mail: future@cix.compulink.co.uk, subject line 'ATTN: JASON BROOKES'.





If you need to, you can venture further afield into the forest surrounding the castle (above left). Wherever you are, keep a close eye on the time, displayed in the bottom left corner of the screen (above right). Don't attempt any critical actions just before you change into a werewolf



The poltergeist's reactions depend on what form you're in (above). Exiting through that high arch is prohibitively hard, but not (quite) impossible

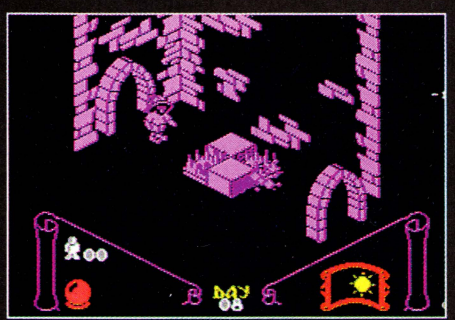
Format:	Spectrum
Publisher:	Ultimate
Developer:	In-house
Players:	1
Price:	£10
Released:	1984

It is probably no exaggeration to say that *Knightlore* represents the greatest single advance in the history of computer games. The first isometric 3D game was not only an unparalleled programming achievement, but it introduced a whole new concept in gameplay. Actually completed before its predecessor, *Sabrewulf*, *Knightlore* was withheld for months because its publishers knew that after its release, consumers would not be easily satisfied.

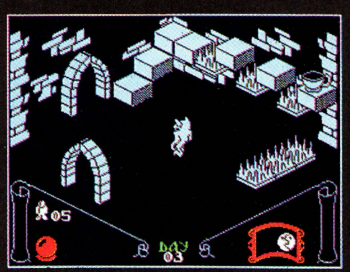
You play Sabre-man (also the hero of Speccy greats like *Atic Attack* and *Sabrewulf*), who has developed a bout of lycanthropy. With 40 days and 40 nights before the disease becomes terminal, his only hope is to collect eight items from around a castle and drop them into a friendly wizard's pot. The wizard will then brew a potion to cure his affliction.

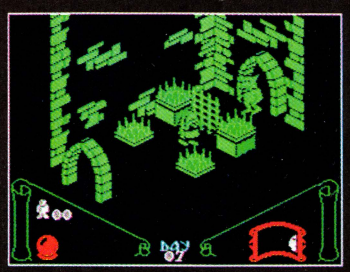
As you wander around the one-colour-plus-black play area, searching for that next elusive ingredient, you can pick up various objects which help or hinder your quest. Pixel-perfect judgement is required, as is speed, because every 12 hours you're transformed into a werewolf, usually just when you could have done without it.

It's a sobering thought today, when games of a similar type require 30Mb of memory, that *Knightlore* was crammed into a minuscule 48K. Even though Ultimate, as Rare, went on to produce well-regarded games like *Solar Jetman* and *Snake, Rattle And Roll* for the NES, *Knightlore* remains their finest hour. It's a great tribute to the game that – ten years later – we still remember it. E

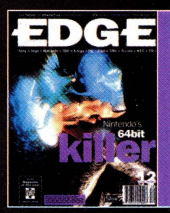


The monochrome colour scheme avoids those notorious Spectrum sprite clashes and doesn't adversely affect the gameplay





There's no time for hesitation here – those floating blocks disappear as soon as you've jumped onto them (top). Negotiating these gates eats up precious time (above)



A new section in the magazine (introduced in E11), Retroview celebrates Ultimate Play The Game's finest hour. Of course, in 1994 it's not clear whether magazine editorial aimed at looking backwards, not forwards, will be a hit with readers, although they're invited to send in their own nostalgic essays, nevertheless.

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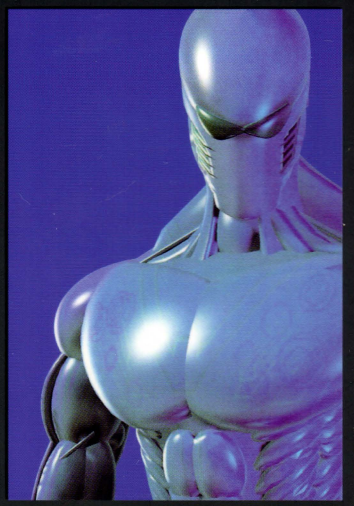

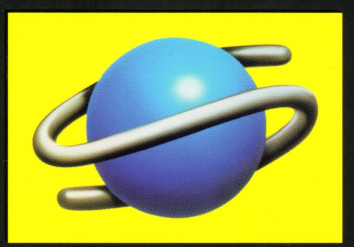

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